COMPUTERWORLD

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NEWSPAPER

NEWS IN BRIEF

Bunker-Ramo Decides To Ax POS Operation

By Toni Wiseman
Of the CW Staff

TRUMBULL, Conn. – Bunker-Ramo Corp. is discontinuing its point-of-sale (POS) operations, a move that affects some 300 full-store operations including Star Markets, Stop & Shop and Shoprite supermarkets.

Although the firm has POS terminals operating successfully for a number of major supermarket chains, the market has not developed at the rate expected at the outset, according to George S. Trimble, Bunker-Ramo president.

"The retarded development of the market for these terminals has increased substantially the anticipated startup costs, resulting in continuing operating losses," Trimble said. "These losses approximated $4 million in 1975."

Bunker-Ramo, which purchased the POS operation in 1973 from Nuclear Data, Inc., will make provisions for some $7 million to cover write-downs and other costs and expenses associated with the termination of the operation.

For the nine months ended Sept. 30, the company reported a loss of $1.9

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CDC Raises Prices, Cost of Maintenance

MINNEAPOLIS – Control Data Corp. has hiked the prices and maintenance costs of much of its hardware and software, but most of the plug-compatible equipment from its Peripheral Products Group was not affected.

The company announced purchase and rental price increases of 2% to 4% on its Cyber 173, 174 and 175 large-scale CPUs. The increase also applies to magnetic tape controllers and a printer used with those machines.

CDC also increased by 10% the initial fee, monthly royalty and paid-up license fees for the Sort/Merge 1 and the Fortran 2, Cobol 2 and Algol compilers used under the latest version of the Scope 2 operating system.

Maintenance prices rose 5% to 15%. Maintenance costs on some software rose 12%.

CDC raised the rental price of its IBM 3420-type tape equipment by 4%, but other Peripheral Products Group prices were unaffected, a spokesman said.

The price hikes are effective now on new business, while increases to current customers will go into effect at various times according to the terms of their existing contracts, CDC said.

Budget Survey Finds

Users Moving on Upgrades in '76

By Nancy Freneh
Of the CW Staff

WALTHAM, Mass. – While users have no record-breaking spending plans for 1976, a majority will move forward on projects and upgrades they postponed last year, according to the annual U.S. DP budget survey conducted by International Data Corp. (IDC).

Large-scale users plan to increase DP spending by 8% and medium-scale users by about 13%, the survey found.

The budgets of large- and medium-scale users averaged together and weighted presage a 10.8% increase in DP spending for 1976 – a percentage point below the actual spending reported in 1975.

However, this year's 10.8% increase will go for hardware and salaries instead of higher expenditures just to maintain the status quo, the report said.

Among the growth signs IDC cited in its report were an increase in application development, more CPU upgrades and virtually no budget cutting.

Fifty-six percent of the Fortune 500 companies and medium-scale users surveyed said they will implement major new applications, while 22% indicated they would refine ongoing applications.

A majority of both size users forecasted additions to their staffs.

By comparison, last year two-thirds of those surveyed said they were deferring new applications and/or limiting staff additions in response to budget pressures.

Nearly 30% of users surveyed – twice the number who upgraded in 1975 – said they have scheduled major CPU upgrades for 1976. Most said they will upgrade because existing CPUs are saturated, but many attributed plans to go ahead now to diminished expectations of "fourth-generation" systems being just around the corner.

Finally, only 3% of users surveyed anticipated a reduction in DP budgets in 1976, compared with 11% at this time last year.

Real Growth Impressive

While the 10.8% spending increase is hardly impressive, IDC said, it will represent quite a bit more in real growth than that recorded last year.

Analysis indicated real growth in projected hardware spending will hit 9% compared with 7% in 1975. DP staff sizes will grow by 4% to 5% compared only with 1% in 1975.

In addition to reduced inflationary pressures, a second factor affecting spending growth is that relatively fewer organizations are anticipating major budget increases.

Only one-sixth of those surveyed, for example, are planning budget increases of 15% or more in 1976. In 1975, twice as many users increased their budgets by 15% or more, IDC said.

Large-scale users said they have already "passed over the hump" in their teleprocessing development plans, at least in the area of big-ticket hardware acquisitions and software development efforts.

Among medium-scale users who are just entering the teleprocessing/data base development phase, most are implementing primarily off-line or local teleprocessing networks with predeveloped system software, thus eliminating the dramatic spending increases that characterized the large users' pioneer nationwide teleprocessing networks, IDC said.

Breaking down the projected 1976 budget figures, IDC said hardware will account for 35% to 40% of DP budgets, a

(Continued on Page 4)

Cook County DP Curiosity Cancels Programmer's Job

By John P. Hebert
Of the CW Staff

CHICAGO – Curious because he had been denied pension funds owed to him, a systems analyst here wrote a program accessing the Cook County Data Processing Department's (CCDPD) pension data base. It cost him his job.

Thomas C. Vanek, a CCDPD employee for seven years, said he was also concerned about a possible misuse of department services for the benefit of private firms before he was fired from his $21,000/year position.

Vanek was formally dismissed for writing a retrieval program and accessing CCDPD pension information contained in the computer files without authorization, according to Joseph Yaeger, acting director of the department.

"He was trying to get his contribution to the county employees' pension fund" and a listing of employees who withdrew their money to determine irregularities about the fund, Yaeger said.

But Vanek maintained his dimissal was for reasons of "political retaliation" because he had been curious about possible department misuse of both CCDPD machine time and money contributed mandatorily to the county pension fund.

"But none of the charges brought against me had much of anything to do with what I had done and weren't good cause" for his dismissal, Vanek claimed.

Entered Politics

Vanek said he decided to become active in county politics after he was denied some $9,000 in pension funds he had been required to place into the county's pension fund and after he saw Yaeger was able to take money out of the fund.

In addition to this, he was upset about the use of the department's IBM 370/145 which, he alleged, was being misused with Yaeger's authorization.

Vanek said he saw Yaeger run off 35,000 tax documents for Palman Federal Savings and Loan. In another instance, he said, six CCDPD magnetic tapes were brought to the computer system at Chicago Title and Trust Co. to update the company's files.

"These firms have no relation whatsoever to [CCDPD]," Vanek said, "and I questioned [Yaeger's] authority to provide them with services or give them privileged information."

In the case of the tax documents, Yaeger told people from Palman Federal who were at CCDPD to pick up the documents to leave when Vanek challenged his authority, and "he wheeled the information out of the department himself," Vanek said.

Vanek attempted to take his money out

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Prime Says 400 System Equals Performance of DEC PDP-11/70

By Esther Surden
Of the CW Staff

FRAMINGHAM, Mass. – Prime Computer, Inc.'s 400 system provides three times the throughput of the Prime 300 and the performance characteristics of the Digital Equipment Corp. PDP-11/70, according to the vendor.

The processor, configured on two printed circuit boards, is being offered as a top-of-the-line upgrade to Prime users with large data bases. All software and peripherals for the earlier 100, 200 and 300 systems can run on the 400 system without modification, a Prime spokesman said.

Existing CPUs using 32K-word memory boards can be upgraded to a 400 without changing memory, he added.

The 100, 200, 300 and 400 systems are also known as Tempus Level 1 through Level 4.

The maximum physical memory for the 400 is 8M bytes of MOS storage, the firm said. In addition to main memory, the 400 has a 2K-byte cache memory that acts as an over-all buffer for physical memory.

The cache memory has an 80 nsec access time to information most likely to be used next in memory, a spokesman said. The cache hit rate is approximately 85%.

Memory is two-way interleaved for faster throughput, the firm said. Segmentation and paging memory management techniques allow up to 64 simultaneous users to access a virtual address space of 512M bytes.

I/O is handled in the same way as on previous Prime processors, but as many as 15 separate controller boards can now be attached directly to the bus. Each board can contain a maximum of four controllers, and I/O bus extenders allow the bus to accommodate additional controllers,

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Although Devices Reliable

User Inexperience Called MSS Pitfall

By Patrick Ward
Of the CW Staff

KING OF PRUSSIA, Pa. – Mass-storage systems (MSS) appear to be reliable devices, but "the pitfall basically is that there's very little user experience with them," according to Carol B. Peters, technical director of mass storage systems at Informatics, Inc., a systems house.

Users should not have much trouble converting moderately sized disk-based applications to IBM's 3850 and other MSS units, Peters said in an interview at the IEEE Computer Society's Second Workshop on Mass Storage Systems here last week.

However, MSS has not yet proven itself for use in large, data base management-oriented shops, she added.

When a DP shop uses large sequential tape files for true sequential processing, converting those files to MSS could bring a throughput loss, Peters said.

"But there are many sequential applications in which only a small percentage of records are actually being processed," she said.

Those applications might be too large for disk, but MSS could handle them with less of an I/O load than tape sequential processing, she said.

Prime Advantages

One of the prime advantages of MSS, she continued, is that it can make data accessible on-line when it is not economic to place that data on disk storage.

The other chief advantage of MSS is that it eases management of the DP center, Peters said. MSS does not need operators to load or unload its media. In the case of the IBM and Control Data Corp. machines, selector arms or "pickers" bring the MSS data cartridges to read/write stations.

MSS also catalogues its own files, eliminating the need for a human librarian . . . and can lessen a DP shop's need for floor space, Peters said.

MSS like IBM's 3850, CDC's 38500, Ampex Corp.'s Terabit Memory and Precision Instrument's 190 are "inexpensive media compared with disk," Peters said.

Unlike conventional tape media, they can "store a large quantity of data in a partially on-line mode so the data can be accessed by a computer without human intervention."

But MSS "is not a disk," Peters continued. "It's a lot slower."

"For that reason, all the current MSS systems use disk staging between the CPU and the MSS itself," she said.

On-Line Extension

"In that sense, MSS is an extension of on-line storage in much the same sense disk has been used as an extension of main memory in virtual memory systems," Peters said.

The Ampex Terabit MSS produces a second, archival copy of its data to back up the user, Peters said. IBM and CDC MSS users could achieve the same effect themselves by linking a 6,250 bit/in. tape drive to their MSS units, she said.

Both CDC and IBM say their users can remove cartridges from a failed system and run them on another MSS unit from the same manufacturer, she said.

Users interested in going to an MSS system should study their pattern of file usage first, Peters said.

The user then has to compare that information with what the various MSS systems offer in "a fairly traditional systems study," she concluded.

Prime Introduces 400 System

(Continued from Page 1)

Prime said.

A disk storage module provides 300M bytes of storage capacity per drive. One disk controller can handle up to four drives and provide a total of 1.2G bytes of on-line bulk storage, according to the firm.

Other peripherals introduced with the 400 include an electrostatic printer/plotter and a 600 line/min printer.

Most internal data paths on the 400 have been widened from 16 bits to 32 bits, a Prime spokesman said.

'Inseparable' Software

Software for the 400 system includes the Primos operating system, not available on the other Prime models. Part of the operating system is implemented in memory-resident software and part in microprogrammed firmware, thus making the CPU and the operating system inseparable.

Primos functions as both a disk and real-time operating system and supports shared reentrant procedures that permit a single copy of a software module, such as a Fortran compiler, to be shared by multiple users.

Cobol will be available for the 400 in the near future, the spokesman said.

Byte parity checking is provided throughout the processor and main memory.

The basic Prime 400 processor with 256K bytes of memory and byte parity on a 17-board chassis costs $17,200. The Primos operating system is priced separately at $12,000.

The 400 has also been packaged in a system called Create 4 for business users. Create 4 includes the Prime 400 with operator's console, two cabinets, an interface for the operator's console, a magnetic tape drive, an 80M-byte disk and controller, a 300 line/min printer and a 16-line asynchronous multiline controller.

The Primos software is included for the system price of $130,000, Prime said from 145 Pennsylvania Ave., Framingham, Mass. 01701.

Bunker-Ramo Discontinuing POS

(Continued from Page 1)

million against a year-ago profit of $4.5 million.

There are some 3,000 Bunker-Ramo terminals installed in supermarkets, representing 14% of the available market, according to International Data Corp. figures.

For the time being, business will continue as usual, according to a company spokesman, and it will be two to three weeks before a long-term agreement for maintenance and service is put together, although all customers have been notified of the company's plans.

That service agreement will cover "some extended period of time" which has not yet been defined, he said.

All equipment already on order will be shipped if the customer still wants it, the spokesman said, adding he anticipates some cancellations. New orders will also be accepted for a "small period of time."

A number of employees have already been laid off at the manufacturing facility here as the result of the discontinuation. Last year, Bunker-Ramo laid off 600 workers, 200 of whom were rehired after the company received contracts for brokerage and banking information systems.

Some workers from the POS operation will be transferred to the brokerage and commercial systems opeations, which are also located here, the spokesman said.

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Milgo Sues AT&T, BCS, Others After Patents Upheld

By Nancy French
Of the CW Staff

TOPEKA, Kan. – Ten days after the U.S. District Court here ruled three firms infringed Milgo Electronic Corp.'s patents related to data modems, the firm filed suit on the same grounds against one user and three of the largest communications companies in the nation.

The patent infringement suit initiated in July 1971 was won against United Business Communications, Inc. and its parent company, United Telecommunications, Inc., both of Shawnee Mission, Kan., and Rixon Electronics, Inc. of Silver Spring, Md.

Damages have not yet been set, but the court ruled Milgo the owner of the three patents and all rights thereunder, including the right to sue for and to recover for past infringements.

The new suit was filed against Boeing Computer Services (BCS) of Dover, N.J., American Telephone and Telegraph Co. and Western Electric Co., both headquartered in New York, and Southwestern Bell of St. Louis.

The complaint, which now involves four communications patents, alleged that AT&T data modems No. 208 and 209, manufactured by Western Electric, infringe Milgo's patents.

One patent which was upheld last month and is allegedly being infringed by those named in the new suit involves the narrow-band concept of data transmission which allows modems to transmit data at high speeds over voice-quality telephone lines.

District Court Judge George Templar found "no prior art modems or references ever taught the industry to use only a small narrow part of the line so that within that part all the lines look alike and dependable."

As for the firm's two patents dealing with digital detectors, the court ruled the claimed features of one of Milgo's patents "represent significant and non-obvious improvements over the analog detectors."

Since the first three Milgo patents were ruled valid, the latter two are "presumed valid with the burden of proof otherwise falling on AT&T and the other defendants," Milgo said in its latest suit.

In the new case, Milgo is seeking a temporary and permanent injunction against the manufacture, lease, sale or use of the Bell modems in addition to damages.

Codex in Related Action

Codex Corp. is involved in a related action. Milgo has filed a declaratory relief suit against Codex in response to a recent demand by Codex that Milgo cease marketing certain modems that Codex claimed infringe on a recently issued Codex patent.

Here Milgo has asked the court to declare the Codex patent invalid and non-infringed. Milgo also filed a companion suit in Kansas District Court against Yellow Freight Systems, Inc., a Kansas City user of Codex modems.

A spokesman familiar with the case explained that a user in suits of this type would be protected by the manufacturer who supplied equipment which infringed another firm's patent.

In cases where equipment is presently out, a settlement of damages might call for the defendent to pay a license fee. This might ultimately raise the price to the user, he explained, but would otherwise cause him no harm.

Filing a patent infringement suit against a user as well as a manufacturer is the only way to really test a patent, he said.

In another action still pending, Milgo filed a motion in the U.S. District Court for the Southern District of Florida which alleged Western Electric is guilty of a consent decree violation. Milgo filed this motion in response to a patent suit that Western initiated against Milgo in 1974 [CW, Feb. 12].

Burroughs Tells SEC Of Possible Payoffs

By Toni Wiseman
Of the CW Staff

DETROIT – A foreign subsidiary of Burroughs Corp. made "unauthorized withdrawals" of about $1.5 million which may have been used to obtain orders – including orders from a foreign government, the corporation recently told the Securities Exchange Commission (SEC).

Burroughs spokesmen here, however, declined to identify the subsidiary or country involved, but said the company's computer business was involved.

Burroughs made the disclosure voluntarily to the SEC under that office's program to encourage disclosures of foreign payoffs.

The withdrawals were uncovered by Burroughs' accountants, Price, Waterhouse & Co., after the company asked for a report on "any potentially improper payments . . . or political contributions made in violation of established policy."

A Burroughs official said the payments were suspected to have been made over a three-year period without the knowledge of top management.

The payments were made by "local officials" of the foreign subsidiary, he added.

The annual amounts of the unauthorized withdrawals apparently were quite small before 1973. Preliminary figures suggested approximately $600,000 of aggregate withdrawals during 1973 and 1974 and $900,000 in 1975, according to a report in a Burroughs prospectus.

"Further," the report said, "statements to the management of the company indicate that, in most of these transactions, sales prices were increased to approximately offset the amounts of the withdrawals."

Burroughs' board of directors has approved continued investigations "to determine the extent to which any other illegal or improper payments may have been made" in behalf of the company or its subsidiaries during the past five years, the spokesman said.

According to a report submitted to the SEC, the operations of the subsidiary are not material in relation to Burroughs' total revenues, assets or net income. Therefore, "even in the unlikely event that the subsidiary should cease operation," Burroughs' operations would not be seriously impacted.

Approximately 38% of Burroughs' revenues and 40% of its net income came from overseas during the first nine months of 1975.

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Congress Votes Curb on Air Force Inventory Project

By Patrick Ward
Of the CW Staff

WASHINGTON, D.C. – Congress has voted to end further development of the Air Force's Advanced Logistics System (ALS) by appropriating only enough money to keep the project operating at its current level.

Begun in 1968, ALS was to bring the latest in computer technology and management techniques to Air Force inventory management [CW, Dec. 3].

But the data base/data communications project proved "too much to swallow," in the words of a House Appropriations Committee spokesman. The project had already cost $250 million by last summer, but remained far from completion.

The Senate abandoned its own ALS "get-well" plan that would have switched the project from an on-line to a batch-oriented operating system and substantially adopted the House view that the program should stop where it is, Senate and House aides said.

The House and Senate voted the Air Force enough money to buy the installed hardware and to operate the system in fiscal 1976. Eventually, Congress wants to see a replacement plan that reflects "a better fix on the Air Force's real needs" than ALS did, a Senate aide said.

"In the interim, any new logistics system development should use machine-transferable data management software which can effectively operate on the equipment of two or more vendors to ensure competition," a House/Senate conference committee report said.

"We don't want the Air Force hooked into any one vendor," the House aide said.

In April 1972, Control Data Corp. won the bidding to provide ALS hardware and software. The large processors were to be 65K (word) Cyber 73s and Cyber 74s, with SC 1700 small computers handling communications at each site.

The plan called for seven large-scale CPUs in five Air Force logistics centers around the country. The seven machines would have replaced about 90 second-generation CPUs.

According to the plan, each logistics center would have been linked with the others over dial-up lines. Each center would have supported about 500 data entry and keyboard/printer terminals to provide "current and consistent information to all ALS users," the Air Force said.

However, the Air Force found the reliability of the ALS hardware disappointing. The Air Force, which was also the first user of CDC's Zodiac transaction-oriented operating system, said the software had numerous bugs and consumed "excessive system resources."

Ill. Programmer's Curiosity Costs Him His Job

(Continued from Page 1)

of the pension fund and wrote a retrieval program to access the data base for payroll information on Oct. 9 and 10, he said.

On Oct. 17, he recalled, he challenged Yaeger's authority to run out the tax documents for Palman Federal without authorization from the county comptroller.

Didn't Know Opponent

Vanek then decided to run for the position of trustee for the county's Pension Board to have a say about the use of pension fund money, he indicated.

"But I didn't know who my opponent was – they don't tell you that," Vanek said.

Two days before the election last October, "officials barred me from the department. They wouldn't let me enter the building so I couldn't campaign" and cited department rules, Vanek said.

"My opponent turned out to be William Doyle, the incumbent trustee and chief administrative officer of the Pension Board – a bigwig with a lot of political power," according to Vanek.

"Doyle was politicking and I wasn't able to because I was barred from the department," Vanek said.

Vanek noted there is $159 million in the pension fund for county employees and attacked the Pension Board for misuse of funds.

"There's nepotism in the pension plan," Vanek charged, citing a budget of $400,000 for pension fund employees and services when "the information for the pension is coming off the computer.

"What are those people being paid for, when the machine is doing all of the work? What is their function?" he asked.

The only rule broken when he wrote the program to access the pension files occurred when he "didn't notify the comptroller 24 hours in advance that I wanted payroll information," Vanek claimed.

However, this was said to be in direct violation of department rules 9 and 10 which sfate the information must be requested only from the director of the special agency concerned and forms and reports used in systems development cannot be used by anyone without the consent of the user agency, Yaeger said.

Vanek maintained he was not given a "fair shake" at a Civil Service hearing in December because the output he gained from accessing the files could not have been misused.

He will pursue the case against the CCDPD and the Pension Board in federal court because "it is futile to go to the local courts," he said, adding "this whole affair is not over by a long shot."

Users in '76 Plan Upgrades Postponed Last Year

(Continued from Page 1)

6% to 8% increase for large users and an 11% to 12% increase for medium-scale users.

Spending is still concentrated in communications-related equipment, with disk drives and terminals the most frequently mentioned new purchases, IDC found. Among the plug-compatible disk drive vendors, Storage Technology, Inc. appears to be generating the most interest, the survey showed.

Salaries will take a 45% to 50% bite out of the total DP budget, with salary upgrades accounting for an increase of 7% to 8%, and staff additions for 4% to 5%.

As for supplies, which will cost DP managers an estimated 8% to 10% of their budgets, expenditures will rise 4% to 5%, IDC said.

Transmission facilities, which will claim up to 10% of DP budgets, show the greatest increase – up 15% to 20% from 1975 expenditures, according to the survey.

Software and consulting services and other outside services which last year were "negligible" will be "up slightly" but not enough to quantify, IDC said.

More In-House Services

Large-scale users are continuing to bring in-house many "outside" services, such as time-sharing and computer output microfilm and microfiche, IDC reported.

The survey also found DP equipment is heavily utilized, with large users reporting an average of 17.3 shifts per week and medium users averaging 12.4 shifts per week – possibly signaling further upgrade activity in the future, IDC suggested.

Users interviewed revealed a growing open-mindedness, the survey said, with many expressing interest in the large-scale Amdahl 470V/6 system and some medium-scale users indicating they are looking at superminis.

As for equipment financing, few changes are expected during 1976 although third-party leasing remains stronger than might be expected at the end of the IBM 370 product cycle, the survey said.

The survey results were based on a sample of 128 "representative DP-using organizations," IDC said.

Fortune 500 companies sampled account for 35% of the dollar value of the installed base of DP equipment in the U.S. Medium-scale users sampled represent 50% of the installed U.S. base of DP equipment in dollar value.

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On Protocols, Interfaces, Davis Says

Users Must Control Standards to Maximize Benefits

By Naney Freneh
Of the CW Staff

AMSTERDAM, The Netherlands — The key to getting maximum benefit from the computer systems of the 1980s lies in assuring that users rather than vendors control interfaee and protocol speeifications and documentation, Dr. Ruth M. Davis, director of the National Bureau of Standards (NBS) Institute for Computer Sciences and Technology, said here recently.

Speaking at the Diebold XXXV Conference, Davis said by 1980 the trend to distributed architecture should be in full flower, making interfaces and protoeols an ever-more-critical part of every computer system.

"Interfaces and protocols need to be so specified and documented in fourth-generation computer systems that users can substitute individual new-technology devices without replacing interconnected hardware or without buying expensive new system software packages," she said.

Further, they should be so documented that users can prevent system vendors from inhibiting their choices of equipment and software by claiming exclusivity for their products because of proprietary or undocumented interface eharacteristies, Davis said.

Users should be able to control aceess to selected portions of system software, hardware or information banks simply by controlling the interface or protoeols to those system segments whieh are legally, nationally or functionally their responsibility.

Users should be able to aceess "infinitely" large or powerful computers by suceessfully interconnecting their loeal systems to larger and larger computer networks as needed. In this way, they will have to buy only the power they need, Davis said.

Further, users should be able to expedite the transnational flow of information betwecn special-interest communities while maintaining the security of the information they need.

Finally, users should have the ability to sever membership with user communities and become autonomous by a change in the logieal interfaee or protocols interconnecting their systems eomponents with the large distributed systems of which they were a part, shc said.

Working on Standards

In the U.S. the American National Standards Institute (Ansi) X3T9 Committee and NBS are working on interface standards, Davis said, adding that, in Ansi, objectives for defining both a device-type independent and a device-specifie interfaee for minieomputers are near completion.

Further, the International Standards Organization draft proposing an international channel-level interface standard is under final review.

The NBS, in conjunction with the General Services Administration, has recently intensified efforts to develop both device-level and channel-lcvel interface standards, she said.

In the area of protocols, de-facto standards neeessary for computer terminal interoperability exist, and the principle of competitive selection from independent suppliers is well established among customers, she said.

However, some important needs for protocol standards go unmet, including:

- Standard protocols for intelligent terminals.
- Standard eomnunications control protocols.
- Standard high-level protoeols between intelligent terminals, minicomputers and larger computers of a distributed system.
- Standard system-level protocols for interconnecting between subsystems of a distributed system and for interconnecting between autonomous distributed computer systems.
- Standard applications-program-level protocols so that software can be designed with standard interfaces and uniform access procedures.

Other Predietions

Fourth-generation computers will incorporate only two radical technological changes that will distinguish them from their third-generation predecessors: automated reading capability, made possible by development of the wand, and solid-state mass-memory devices such as "bubble memories," cross-tie memories, change coupled devices (CCDs), read/write laser memories and crystal memories.

Since programming or software changes are usually necessitated either by changes in technology or changes in systems architecture, one can expect to see new software packages of all types in the 1980s.

The national emphasis on increased productivity will impact computer software through renewed demands for program emulators that allow fourth-generation computer systems to run application programs developed for earlier systems, Davis said.

Performanee measurement will bc a standard practice employed by DP managers, she predicted.

Shared computer services, offered principally by eomputer serviee vendors through computer networks, will be increasingly popular both in manufacturing and serviee areas, Davis said.

Small businesses will find it more cost-efficient and more productive to buy that portion of a large computer system's power they need only when they need it, rather than making a large capital investment to meet an oscillating demand, she said.

Management reliance on computerized models for planning, forecasting and resource allocation will accelerate development of mathematically reliable models and statistical program packages, Davis said.

This same reliance on large-scale computerized models will popularize computer system arehitecture that makes available massive amounts of on-line and near on-line memory whenever model applieations are being run, she said.

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But Store's Management Likes It

UPC Experiment Provokes Little Consumer Reaction

By John P. Hebert
Of the CW Staff

FRAMINGHAM, Mass. – An ongoing experiment with a Universal Product Code (UPC) scanning system at a supermarket here has prompted positive reaction from store management but very little response from consumers.

The system could save each customer $65 to $75 annually if the store were allowed to stop marking prices on each item it sells, according to Bob Nolan, corporate director of consumer and public affairs of First National Stores, Inc. (Finast).

Shoppers at the Finast Big Buy supermarket here have shown a general indifference to the UPC system, he said, recalling only two instances of negative reaction and one instance when a customer offered positive comment.

When the store first installed the system, which includes terminals at checkout counters, consumer groups were invited to see the system and ask questions but, Nolan said, "no one came."

The store voluntarily attempted to educate customers with a film describing the operation and "bag stuffers" explaining the basics of the system at the checkout counters, he added.

Few people took the time to see the film and just as few asked any questions about the system – or even noticed the difference between the system and the previous electromechanical registers, Nolan said.

Both the store and the consumer could save money if prices did not have to be put on the goods, he said.

By state law, the store is required to price mark each grocery item it sells, "but we would love to take the price off items," Nolan said.

"This is a competitive business. We would be forced to pass any savings on to the customer," he explained.

Customers might not mind an absence of price on items in the store if they were saving money, he indicated.

Big Buy installed a Univac Accuscan system of checkout terminals, scanners and dual minicomputer controllers in the store last August.

Eight checkout terminals, one service booth terminal and the minicomputer controllers located in the store's in-house control center have replaced "11 or 12" cash registers and have been running with few problems of any kind, Nolan said.

About 80% of the store's products now have the UPC-scannable labels and 60 to 75 more products are converted to the code every week.

In addition, the supermarket has an automatic device which prints scannable UPC-like, 10-digit code labels for use by the meat and produce departments.

System Doing Well

The system itself is doing well, according to Ed Woo, Univac's on-site technical representative.

Each terminal is capable of dealing with food stamp eligibility and personal check and credit card validity, Woo said.

A bookkeeper at the service booth terminal, however, handles this information directly, if possible, to avoid long lines at the checkout terminals, he explained.

This terminal is primarily responsible for handling refunds on returned merchandise and other matters which would normally take too much time at the checkout counters, he added.

The service booth terminal is exactly like those at the checkout counters, but it is usually operated in a manager's mode or an accounting mode rather than the checker, or scanning mode, Woo said.

When an article is moved over the laser scanner window on the checkout counter by the clerk, the UPC information is captured by the terminal, decoded and sent to the minicomputers over hardwired lines at 50 kbit/sec, he explained.

The minis, based on RCA 1600 computers, match the product and current price and send the information back to the checker terminal, where it is displayed for the customer on a 12-digit alphanumeric display, he said.

The clerk places the merchandise into a bag "in a swimming motion," he added.

All of the transaction data is sent immediately to the in-store minicomputers at the control center, and all totals are captured by both systems on cassette tapes and bought manually to Finast headquarters, he explained.

During the day, any kind of accounting information regarding the merchandise type and price totals for any combination of terminals during any time period is available to the bookkeeper at the service booth terminal, Woo said.

Finast management was considering going to a fully on-line system this summer, Woo said.

Although Nolan agreed, he said the store here was "not going to do that," but may install 2,400 bit/sec batch communication through dial-up phone lines.

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Editorials

The Real Charter

IBM and AT&T have decided to fight the battle of the Dataspeed 40 CRT terminal before the Federal Communications Commission (FCC). The issue is basically whether the Bell System terminal, produced by Teletype Corp., is a communications or a data processing device.

IBM has been joined in its opposition by the Computer Business Equipment Manufacturers Association and the Computer Industry Association, among others. The opposition contended the latest Dataspeed 40, in its clustered binary synchronous version, is designed to act as a teleprocessing terminal and therefore cannot be tariffed by the telephone company [CW, Jan. 12].

Bell is limited under the 1965 Consent Decree with the Justice Department to offering only communications products and services. IBM and the others argued the AT&T CRT is clearly a DP device and thus should not be tariffed.

AT&T countered the opposition by claiming the Dataspeed 40 is simply an evolutionary improvement in a long line of teletypewriters that grew out of the earliest telegraph devices [CW, Jan. 26].

IBM and the rest of the terminal suppliers offer their equipment in a competitive arena. They feel competition with a regulated common carrier like AT&T is not equitable.

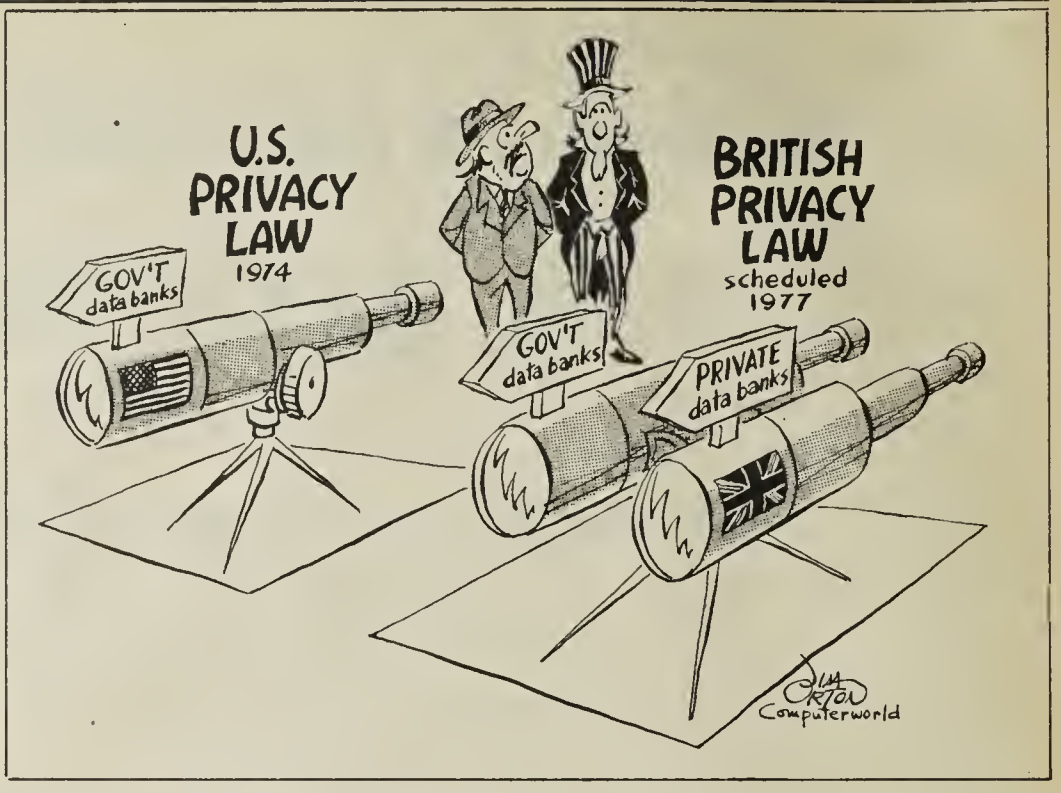
Underlying this argument is the very real possibility that the telephone company can offer its terminal at an artificially low rate by having users of residential or other phone services make up the difference.

The effect of both positions on the end user is not clear. The price of a terminal from a competitor like IBM is presumably based on what the traffic will bear, while the price of a tariffed terminal may be based on factors over which the user has no control.

The Bell System appears ready to enter the arena of DP-related products and services. It is already offering data-only services like the Dataphone Digital Service and, in California, the phone company is getting ready to offer a packet-switched service to state agencies.

The FCC can no longer live with some sort of gray dividing line between the areas of computers and communications. It must address the issue with a broad solution instead of trying to make piecemeal decisions as applications come before it.

And when the commission looks at this difficult problem, it must consider the impact each alternative will have on the user. The public interest is the real charter of a regulatory agency like the FCC, but all too often this fact gets lost in the shuffle of regulatory economics.



'Maybe They've Got Something There . . .'

Letters to the Editor

IBM Shark a Misrepresentation Of Firm's Spirit of Competition

Having been involved in data processing for the last 10 years beginning as a programmer and now as president of a small bank service center, I become increasingly concerned about the psychology used by so many people as they take potshots at IBM.

The cartoon appearing in the Jan. 19 edition showing the IBM shark chewing up its competition missed the true picture.

What should have been used was a picture of a cross-country race with IBM in the lead and the rest either sleeping on the ground, headed in the wrong direction or with their heads in the clouds.

IBM is an example of success through hard work, and its competition cannot stand to think that they must work as hard to accomplish the same ends.

Why doesn't someone try to beat IBM at its own game without the courts' help, or does IBM have a corner on the intelligence market?

Daniel P. Isacksen
Palatine, Ill.

NCR Programs Need No Rewriting

The article, "NCR Shifts 'Spirit' to Full Century Line" [CW, Jan. 12] stated that, "Users who start with 8200 installations can move their applications to the larger equipment with rewrites of the programs."

This is incorrect. A major advantage for the user of the Century 8200 Spirit system is that programs do not have to be rewritten for use on larger machines. As a user's requirements grow, he can move to larger Century computers without reprogramming.

G.P. Williamson
Vice-President
Commercial/Industrial Systems
NCR Corp.
Dayton, Ohio

Compilers Based on '68 Standard

In "Cobol Compiler Audit Routines, Results for Sale" [CW, Dec. 31-Jan. 5], there was a typographical error under the chart showing the validation summary reports which are currently available form the National Technical Information Service. The caption should have stated the reports were for Cobol compilers based on the 1968 Cobol standard.

It will probably be at least a year before a substantial number of Cobol compilers based on the 1974 specifications are available and subjected to the validation process.

Incidentally, the article also should have mentioned that the version of the 1974 Cobol Compiler Validation System was designed for testing up to and including the low-intermediate level of Federal Standard Cobol as defined in Fips Publication 21-1.

Paul Oliver
Director
Federal Cobol Compiler Testing Service
Department of the Navy
Washington, D.C.

(Other letters on Page 10.)

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

DP Memories

Five Years Ago
Feb. 3, 1971

WASHINGTON, D.C. – The Federal Communications Commission has removed the last roadblock preventing Microwave Communications, Inc. (MCI) from offering data services to users between Chicago and St. Louis. The commission approved 11 microwave stations which MCI will use to provide point-to-point service.

– – –

SACRAMENTO, Calif. – State Sen. Alfred Song (D-L.A.), victimized by computer billing systems, filed three bills to defend credit card customers from computerized billing errors and the rigidity of the systems. The bills were well received in the state Senate.

Eight Years Ago
Jan. 31, 1968

PORT CHESTER, N.Y. – A $2,000 service plus "machine time" is being offered to simulate operating conditions of an IBM 360 communications system. Offered by Worldwide Computer Associates, Inc., it is called the WSC360 Evaluator and handles systems running under DOS and OS with Btam or Qtam communications packages. A prime user advantage was described as "greater assurance that a system would run as promised."

– – –

GREENBELT, Md. – An IBM 360/91 is now in operation at the National Aeronautics and Space Administration's (Nasa) Goddard Space Flight Center here. After completing system tests, the performance of the huge system exceeded Nasa specifications, according to F.G. Rodgers, president of IBM's DP Division.

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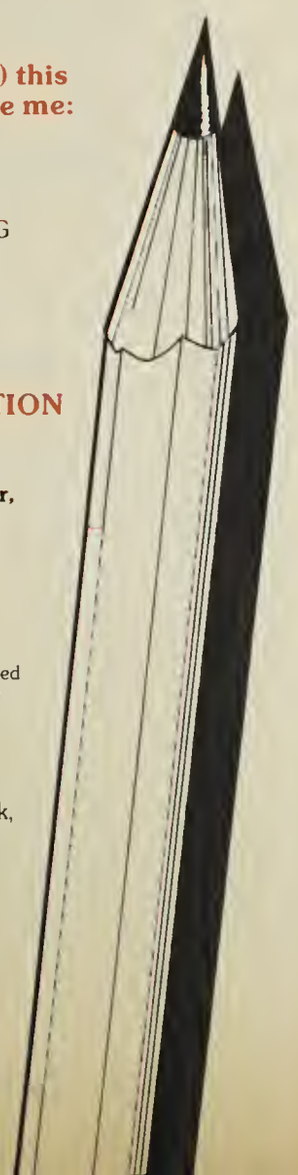

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E Purr Si Muove!

Galileo said it: it *does* move! Our peculiar business/trade/racket, that is; in fact, we have had already, in less than three decades, several overturns of our basic philosophy almost as radical as the transition from Ptolemaic to Copernican cosmology. The stored-program concept (replacing separated control), huge on-line storage (instead of card-and-tape files), time-shared systems (instead of batch), decentralized operations (instead of central giants). Note that I say "philosophy": the embodiment in relays, electron tubes, transistors and chips, and the advances in communications and in peripheral hardware are equally impressive. In astronomy, the progress from the lenses that unveiled the satellites of Jupiter to the machinery at Kitt Peak was not nearly so vast, and took three centuries instead of three decades.

This column is really about how much more "it" can move, as well as about how far we've come already. Take the matter of speed: with chip structures carved by electron beams, we run into the limitations of the metallic (solid) state, probably even before reaching the packing densities which Siemens, IBM, and university people have described as posing insuperable energy dissipation problems. These same factors limit memory density, although we can go far beyond the fine structure limits due to the wavelength of light – the laser/hologram mass memory idea. In architecture, we can go to "wired" high-level language and to associative processes; the idea of self-organizing systems remains only a dream, alas! Input is conceptually simple, with the whole western world on-line to EFTS and its FBI siphon; output also should impose no limits, with a broad band drop wire, a Touch-Tone telephone, a television set, a home Xerox copier and several digital wristwatches in every hovel.

At a guess, I'd say we have two (decimal) orders of magnitude yet to exploit in speed, three in memory "usefulness" (a blend of size, cost and access speed), and one in architectural improvmenets. That is, the ultimate machines can be a million times more powerful – and a thousand times cheaper per unit operation if not unnaturally degraded – than the present ones.

I assume that in the world of the future, data processing and computation will have a spread, cover a spectrum, of power as they do today; that small or isolated or poorly-operated equipment may have a tiny output compared to the greatest and/or best. But I assume that the poor end *and* the powerful end will both be improvable by that factor of a million. Sounds fantastic, doesn't it?

But caution! I watched a boss of mine, in a think-tank exercise, once make arguments about human leisure. He showed how we could do things so succinctly in the year 2001 (that was before Saudi Arabia was perceived as a world power) that we could halve the work week, or go even further. He pointed out, however, that we had *already* reduced the work week from a hundred hours in ancient and feudal times to less than forty; that to knock off another twenty would add only a little additional leisure to the huge amount we already have. So it is in computing.

If we take an electric desk calculator of the Thirties as a starting point, remembering that in those days some people "did sums" with paper and pencil and others had fairly powerful punched-card installations and analog calculators, so that then too there was a spectrum of available power, we can look at today's achievements, in the fading days of the fourth generation. In speed we have gained a hundred million-fold; in memory capacity, a billion-fold; in reliability, maybe tenfold in absolute time; fetch distance is beyond Jupiter, I guess, but that's a hard one to factor in. And because the von Neumann/pigeon-hole memory machine of today is organized very much like the old hand calculation equipment, cranked or electrical, I give our current machines small gain on that score; multiprocessing, with the walled-up ILLIAC IV as an exteme case, would be about all, and few installations have more CPUs than statistical labs had desk calculators in the Depression!

Let's say, then, that from the invention of number to the desk calculator we had a power increase factor of two orders of magnitude, from the Marchant to the present, another eighteen; from the present to the limit, only six more. Those six orders represent a third of what we have achieved in the last three decades; if we move at our present rate, ten more years should see us well over the hump of the S-curve and onto the plateau.

I was down on the toe of the curve from 1936 to 1945, calculating orbits and tracing optical rays on desk machines and looking for improvements in the few-percent range. If Honeywell doesn't put out a contract on me, I hope to be "over the hill" in ten years, or by the end of the sixth generation. If there is no 1988 blockbuster announcement to match the 1952, 1964, and 1976 ones, I'll be able to relax at last!

Oh, a note to classicists and Italians: the extra letter in the title, assuming the CW proofreaders don't rob me of it, memorializes the newest addition to the Grosch clan: an eight-week-old Burmese named George. Indeed, like the computer, he really moves!

Herb Grosch

If Solution Not Available

Simple Measures Improve Image of Multiple Mailings

The Taylor Report
By
Alan Taylor, CDP

The varied problems of multiple mailings got quite a workout after the Dec. 24 column, "Multiple Mailings One of DP's Unsolved Problems." No one came up with a practical, complete solution, but the modernization of an old and often unused idea does appear to attack one most intransigent problem. At the same time some new questions such as just what a duplicate is were raised, and almost enough material to start forming a basic data book came in.

The dividing line between the apparently solvable and insolvable areas was clearly related to the availability to the mailer of all addresses being considered for mailing. *Computerworld*, for instance, does not have access to all the mailing lists it uses for subscription promotion. It obtains the right to send material to the people on the lists, but it cannot take a copy of the lists and set up comparisons between the data on the CW files and the data on the other systems. As a result, some hard-reading people like subscriber V.J. Hermsdorfer of Chicago recently got six copies of a single promotion – one each coming form six separate lists.

Much mailing is handled using such use-but-not-access lists. One old solution which is used sometimes includes a note saying "Sorry if this is a duplicate – please give to a friend." An update of this might be a similar note explaining that privacy protection is the reason comparisons are not made.

Another possible appraoch to reduce this problem is staggered mailings, but this, at best, cannot deal with cases where something timely, like Christmas or an exhibition opening, is involved.

So, when multiple mailings are coming from different lists that aren't compared, there is no solution in sight. Sorry about that.

Merge/Purge Operations

When the mailer does have access to all the lists, the situation is a lot better. A standard commercial approach has evolved that can be used by noncommercial users quite economically, and two interesting innovations are in successful use also. In addition, the problem is being defined with more precision in this area.

Here the multiple-mailing problems have been broken down as follows:

- Define what a "duplicate" is, for the purpose of the mailing.
- Design a match code that will identify such duplicates.
- Purge any cases where there are multiple identical match codes.

This procedure, referred to in the computerized mailing trade as merge/purge, is quite costly. It involves reformatting all the names into some common format, sorting them, forming their match codes and examining the codes for equality.

However, a reader Steve MacKinney with the Systems & Procedures department of a religious organization, has a solution: "The Cobol program used to identify possible duplicates can process our 350,000-name file in about four hours, and it is run every few months in one of our slack periods." Equally, his manual review, used to actually purge names, is also used on lowest-priority basis, so the real cost to the installation is not so much as it might appear.

Match Code Differences

There does appear to be some significant differences in the match codes being used. The shortest – around 16 characters with half numeric – consists of the Zip code, the numeric part of a street address and the first four characters of a person's last name.

Other, longer versions all seem to be based upon the Zip code and the full last name, with additions such as first initial or an identical street or corporation address line being thrown in for good measure.

MacKinney also is running an interesting innovation at this point. When he comes to problem cases, he is having both labels printed and sent with a form letter to either of the addresses concerned. The form letter asks simply "Are you also the person on the second label?"

He told me it has been a successful operation, which the organization estimates is saving it over $1,000 monthly in postage. I like this approach.

Another approach that is successfully reducing duplicate mailing is holding a 30-day floating file of inquiries received and not yet answered. New inquiries are checked against the file and, where possible, consolidated responses are made.

One marketing firm, Ruppman Marketing Services, is charging 25% to 30% per letter eliminated through this approach, by comparison with the cost of "actualized" letter, to use the ghastly jargon of the trade. Here, it pointed out, the computer is reducing the number of mailings.

No one disputes the fact that multiple mailings are a blot on the computer image, and few seem to believe that either of the extreme approaches (address everyone with Social Security numbers or some such universal identifiers or simply let the recipients throw the duplicates away) are really practical, although both had quite strong adherenets in the mail.

However, it does appear that, with a real explanation of why duplicates occur and what is being done to keep them from harassing people, it may be possible to improve the reaction to computer snafus when they do occur. Your thoughts are welcome.

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Corporate Executives Should Be Involved in DP Goals

By George Glaser
And Gopal K. Kapur
Special to Computerworld

For an unfortunatley large number of chief executives, the computer and the people who surround it are a colossal pain in the corporate neck – they represent a substantial and growing portion of operating expenses but user dissatisfaction continues to plague them.

The chief executive officer is increasingly frustrated by his inability to get a handle on this problem. He's not sure where he stands in terms of the quality of his current systems and people, and he's uncomfortable about where he's headed in terms of still higher costs and perhaps still more disappointments and aggravations.

Nor does he fully understand what's expected of him or how to go about fulfilling his responsibilities.

We recently interviewed 35 managers in 30 companies about their DP departments. Those interviewed included user department heads, DP managers and management consultants. These facts stood out:

- Top management stands accused of complacency, indifference and lack of real concern for the corporate DP effort.
- DP management stands accused of lack of leadership and understanding of operational problems and priorities.
- User management stands accused of reluctance to provide direction to DP and of unwillingness to participate and cooperate in DP development efforts.

Sad State of Affairs

These results portray a failure at all levels of management – executive, user and DP. There's not much to be gained, however, by pointing to any one of them as most culpable; each has contributed in his own way to this sad state of affairs.

It is little wonder so many DP departments flounder in disorder and frustration. Only a small number of companies recognize the need for top management's active participation in setting the goals and direction for DP departments.

There are exceptions, of course: Frederick R. Kappel, chairman of AT&T, wrote as follows in the *Columbia Journal of World Business*: "We want our executives to have a direct familiarity with the disciplines computers impose. We want them to have an absolute first-hand realization of what is involved in rethinking our own business to create the new information systems that will best serve our purpose. We want them to go their part of the way to find common ground with the experts."

We strongly support the idea that top corporate management needs to become involved in DP, but we don't believe "music appreciation" courses are the proper mechanism for getting that involvement.

Attempts to educate and involve top managers in company DP efforts have followed a familiar pattern: a short course on basic DP principles, a tour of the computer center and an introductory exercise or two in a programming language. This approach has proven to be worthless expenditure of time and energy – entertaining perhaps, but not very productive.

Topics for Schooling

To really get top management involved in a productive way, it must be schooled in DP management problems, including the following specific topics:

1. Overall management – to define the responsibilities of top management, users and the DP staff.
2. Planning – to meet the short- and long-range corporate information needs and to identify ways technology can meet those needs.
3. Budgeting – to force the specific recognition of priorities for development projects, including the expansion of hardware/software.
4. Organization – to design the internal organization of the DP department and its placement within the corporate structure for maximum effectiveness.
5. Project management – to ensure worthwhile opportunities are identified, budgets and schedules are realistic (honest?), and project control is effective.
6. Personnel management – to understand the need for career path planning, skill evaluation and upgrading and long-range staff development.
7. Security – to understand the nature and magnitude of threats from fraud, vandalism, natural disasters and human errors.
8. Privacy – to respond to state and federal legislation intended to protect the rights of individuals.

Convincing Answers

The DP manager would be much better off if top management were prepared to ask good questions about the above subjects and if the DP manager were prepared to give convincing answers. This certainly would increase his esteem in the eyes of senior executives and might substantially improve his opportunity for increased responsibilities and the stature and compensation that go with them.

We have prepared a list of 50 questions based on the above headings and we believe the chief executive should ask of his DP manager. If you would like a copy, write to Gopal K. Kapur, 776 El Cerro Blvd., Danville, Calif. 94526.

Glaser, a past president of the American Federation of Information Processing Societies, is a consultant specializing in the management of technology-based companies and of DP. Kapur is a consultant specializing in the management of DP with special interest in education and training.

Reader Commentary

Letters to the Editor

System Already On-Line

In an effort to correct the problems in the article, "Mired in Work, Pollution Agency Turns to DP Aids" in the Oct. 29 issue, we are providing the following information:

- The Environmental Protection Agency (EPA) is not "slowly implementing a computer system to help determine whether industries are meeting their pollution reduction deadlines on time." The Permit Compliance System (PCS), which was designed to fulfill this need, has been fully operational and on-line since February 1975.
- The "head of the computer center in the Great Lakes Region" is Merlin Dipert, chief, Data Systems Branch. Carol Foglesong is the chief of the Compliance Unit and is a user of the PCS.
- The "Great Lakes coordinator of the PCS" is Daniel C. Morris (Region V, PCS coordinator). Robert Schneider is the Great Lakes coordinator for Region V.

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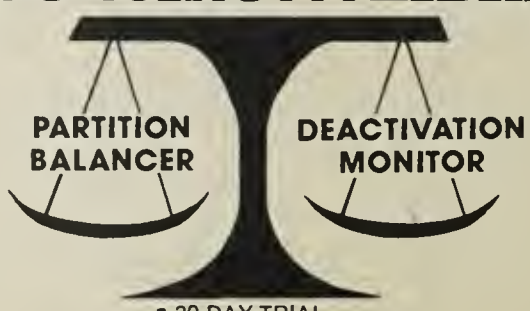

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Survey Shows Multimedia Growth

Users Moving to New Resources for Staff Training

By Don Leavitt
Of the CW Staff

DALLAS – Users still depend heavily on their hardware vendors for staff training, but that dependence is slipping somewhat as other training choices – especially multimedia courses – improve in quality and availability, according to a recent survey of 249 U.S. DP organizations.

A very small percentage of the typical DP budget is allocated to training, President Chet Mills of Marketing and Sales Support, Inc. (MSSI) found, and the lion's share of that goes to the vendor of the installation's hardware.

That dependence is strong, he said, despite criticism by many managers that vendors' courses are too general or too positive about the environment created by their machines.

The problem continues, Mills added, because DP managers don't have access to professional, objective trainers although they have "enormous training requirements."

But there is movement away from dependence on the mainframe vendor. Multimedia instruction has become increasingly popular with DP departments during the past two years, a trend that shows every indication of continuing, according to MSSI.

"Reactions to programs utilizing multimedia approaches have generally shown higher degrees of success as measured by higher levels of satisfaction, ease of use, feedback and high levels of course material retention," the survey found.

MSSI interviewed DP managers, education and training managers and coordinators who responded from a random sample of 300 organizations. The DP staffs included more than 20 organizations in each of six size ranges, from less than 50 employees to more than 1,000.

Among the survey's findings were:

- The level of satisfaction with training results rises in proportion to the number of firms with formal training organizations, career planning programs and dollars spent per employee.
- Multimedia training rated consistently higher than classroom training in flexibility of course content, scheduling and adaptability to student needs, in both basic and advanced DP education.
- The increased use of multimedia training over classroom training supplied by vendors can, in part, be attributed to the lack of technical course content and class availability inherent in a lecture format.

MSSI also found a positive correlation between higher levels of training productivity satisfaction and the existence of a centralized training control within an organization.

"Many orgnizations which did not have centralized training control indicated a plan had been established to establish centralized training control within the next year," the report said.

The survey reported the primary DP education and training needs for the next two years as projected by DP management was seen in three general areas: data base management systems, programmer productivity and communications.

MSSI is at Suite 335, 7540 LBJ Freeway, Dallas, Texas 75251.

Peopleware

CUC Puts Amdahl On-Line to RJE Users

SAN FRANCISCO – Users of remote-computing services have another environment to evaluate: A 2M-byte Amdahl Corp. 470V/6 – soon to be 4M bytes – has been installed at the Sunnyvale, Calif., data center of Computer Usage Co., Inc. (CUC) for use by customers, especially in remote job entry (RJE) or remote batch applications.

Formally announced by Amdahl only last November [CW, Nov. 5], the 470 is IBM 370-compatible. CUC replaced an IBM 370/158 when it brought in the Amdahl CPU.

The changeover allowed the company to maintain its software library, including support for Cobol, PL/I and other high-level languages, but sharply improve the processing speed available to clients, a spokesman said.

As one example of the service CUC expects to provide, he noted CUC now guaranteed 20-minute or faster turnaround on batch jobs or program development jobs "or you'll get your money back."

Remote FM

CUC sees the 470 as powerful enough to support remote facilities management operations in which the Sunnyvale Amdahl can completely replace existing 370/135 or 145 installations at customer sites.

A variation of the complete replacement concept, under which clients could use the CUC machine as a backup system in case of a major catastrophe at their own sites, was also envisioned as a possibility by the CUC spokesman. That possibility exists, he contended, only because of the power of the Amdahl 470.

The Sunnyvale data center was acquired from Singer Corp. last September, along with Singer's user base which was especially broad in the western U.S., according to CUC. The new owners are installing high-speed data communications lines to service users in the eastern states more effectively, the spokesman added.

CUC's Amdahl 470V/6 became operational late last autumn.

The billing algorithm used by CUC takes into account use of the various system resources and is "very complex," the company admitted. It is esesntially the algorithm developed by Singer for its 370/158 service, but modified for the Amdahl environment, CUC said.

CUC corporate offices are at 300 Montgomery St., San Francisco, Calif. 94104.

Industries Courted by NCR 499

DAYTON, Ohio – Application packages announced with the NCR 499 (see Page 23) may make the system seem like a specific alternative to IBM's System/32 for some users.

The NCR software is aimed directly at certain industries, as are IBM's Industry Application Programs.

One of the NCR 499 packages was designed to help small and medium-sized building contractors. The package includes separately priced job-costing, payroll, accounts payable and general ledger applications, NCR said.

In another direction, the Manufacturing Inventory and Billing System (Mibs) is intended for small manufacturing companies with 20 to 250 employees, 300 to 700 inventory items and annual sales of $500,000 to $10 million.

Mibs provides detailed listings of components parts or "explosions" of each finished item carried in inventory. This "bill of materials" approach and the speed at which inventory can be accessed on the 499 are unique for this size of equipment, NCR claimed.

The software utilizes magnetic ledger cards for its bill of materials file and magnetic tape cassettes for the components inventory file. During customer invoicing, the system reserves items in inventory and produces packing slips and costing information, the vendor added.

A range of management reports are also produced by this system, which runs on a 24K NCR 499 and will be ready in March for a one-time charge of $800 beyond the cost of the hardware.

The contractor's package is meant for firms with 25 to 150 field employees and 20 to 50 active construction projects. The job-costing application details all labor, material and subcontractor cost information and compares actual costs with estimates.

Capable of running on a 16K NCR 499, these applications carry one-time license fees of $900 (costing), $1,000 (payroll), $900 (accounts payable) and $700 (general ledger). Like Mibs, they will be ready in March, NCR said.

'DFP' Reads Abend Tables

SUNNYVALE, Calif. – A low-cost diagnostic program from Boole & Babbage, Inc. (B&B) was designed to help users interpret all internal tables in the event of an abnormal ending (Abend) to any program.

Called the Dump Formatting Program (DFP), the package can be installed in IBM's OS and VS environments, the vendor said.

When DFP is in place, it is called up whenever a program ends abnormally. It causes a normal dump as well as a diagnostic reformatting of all internal tables with the vital information printed out in English.

DFP is available on a 21-day free trial. Cost of the package for MFT and MVT is $200; for VS1 and SVS, the cost is $495.

Source for all systems may be purchased for an additional $100, a spokesman noted. B&B is at 850 Stewart Drive, Sunnyvale, Calif. 94086.

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'Pro/Test' Gains Bit Manipulators

BURLINGTON, Mass. – Better documentation and the potential for bit string manipulation during creation of new files are two of the enhancements in an updated version of the Pro/Test data generator package from Synergetics Corp., the vendor said.

Available for IBM 360/370-based installations, the software is said to create test files with any combination and number of record formats in any sequence and in any volume. Output may be directed to magnetic tape, punched cards or direct-access devices in the user's choice of standard or unique file organizations.

Data on the generated files may also be in the user's choice of formats. Contents of the output may be specified directly, or the technique for creating new data may be defined down to the time level, the vendor added.

The updated version allows comment cards to be included along with the file specifications so that file listings, printed at the end of each file generation, may include language the user finds helpful in determining what the purpose of particular parts of the file was meant to be.

A File Summary report, providing cross-reference information, record counts and control totals, has been added to the previous reports. These included the File Audit, listing the user's originating parameters; File Analysis, showing which Pro/Test options are in effect; and the File Print, showing the results of combining the parameters and the options.

Using about 48K of memory, the software is available now for a one-time charge of $6,950, the spokesman added from One Garfield Circle, Burlington, Mass. 01803.

'IQ,' 'QCRT' Run on H6000s

WALTHAM, Mass. – The Management Group, Inc. (TMG) has adapted the coding of both Information Quick (IQ) and Quick Change Real Time (QCRT) to operate under Gcos and GRTS on Honeywell 6000 series CPUs. The packages were previously available only on IBM 360/370 gear.

IQ is a report-generator package which allows the nonprogrammer to use it through entries on a special coding sheet. A series of control cards punched from the coding sheet can create programs to produce complex summary and matrix reports, TMG added.

The package supports multiple simultaneous file-matching operations and creation of new card, disk or magnetic tape files. Multiple reports and multiple files can be created on a single pass of a user's input file, the vendor added.

QCRT, described as "the only on-line file-management system on the market," allows programmers to build on-line applications entirely through parameter entries, "ignoring reentrancy and monitor requirements," a TMG source said.

Procedure capabilities supported by QCRT are said to include subscripting and table lookup operations as well as special on-line features such as screen linking and intertransaction communication.

In the Honeywell implementation, task duration times on the order of 1 sec have been experienced for "complex 3,000-byte multiple file, multiple record and special-variable-file applications involving over 200 remote and local terminals," the spokesman claimed.

IQ costs from $9,000 to $15,000 and QCRT from $10,000 to $25,000, depending in each case on the facilities selected. TMG is at 393 Totten Pond Road, Waltham, Mass. 02154.

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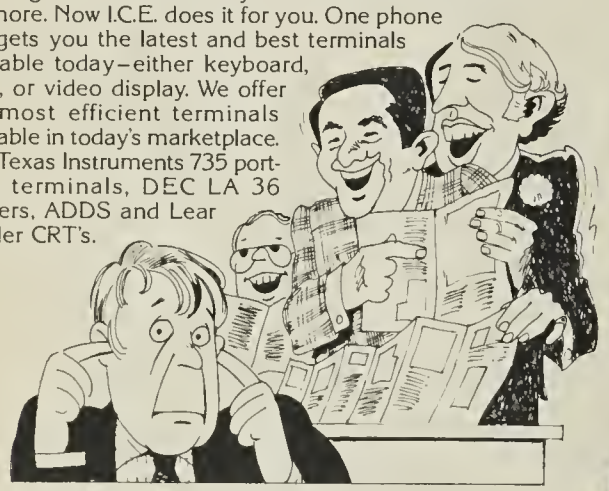

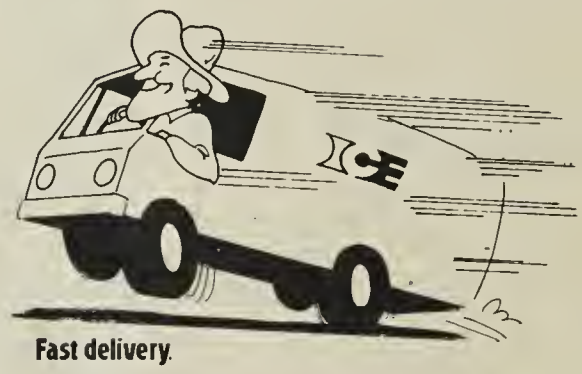

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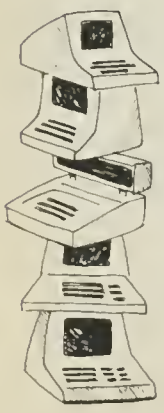

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LOS ANGELES – Decision makers who need demographic information in a hurry for evaluation of "any site in the country" can get help through the National CSS remote-computing network or by telephoning Urban Decision Systems, Inc.

In either case, users will be able to utilize the capabilities of Urban Decision's Tele/Site service which matches the user's choice of location and evaluation criteria against a data base of census information from the U.S. government and other sources.

Standard Tele/Site reports list demographic data concerning the area around a specific point, and these listings can focus on any aspect of the population the user views as significant.

The system is available through Urban Decision for a minimum of $16 for a single report mailed to the user before the next business day.

More substantial requirements might be more effectively met through use of the National CSS network, where Tele/Site may be used under perpetual license for a one-time fee of $20,800.

The vendor spokesman added he "wouldn't be comfortable" installing the system on a user's own computer.

Urban Decision can be reached through P.O. Box 25953, Los Angeles, Calif., 90025.

Professional Seminars Planned by Detroit ACM

DETROIT – The Spring 1976 series of professional development seminars sponsored by the Metropolitan Detroit Chapter of the Association for Computing Machinery (ACM) is open to all and is "certainly not limited to ACM members," a chapter spokesman said.

The series includes two four-hour seminars ($15 each): "Structured Programming in Cobol," conducted by Dan McCracken, and "Hand-Held Calculators," conducted by Barry Wolfe.

Eight-hour seminars ($25 each) include "Data Base Management Systems," led by Alan Merton; "Virtual Memory," headed by Ron Srodawa; "Micro and Mini Processors," conducted by Ken Burkhalter and "Computer Performance Evaluation," led by John Boyses.

Also offered are "Structured Programming and Systems," headed by Mike Marcotty, and "Modeling and Simulation," with Steve Hepler instructing, the chapter said.

With the exception of McCracken's course, the seminars will be held evenings during March at Lawrence Institute of Technology.

McCracken's course will be offered during afternoons, the spokesman noted.

Registration information is available from the chapter through P.O. Box 1091, Warren, Mich. 48090.

Books on Structured Programs, Data Bases Notably Better in '75

More than 300 computer books were published in 1975, an increase of 50% over the prior year. The ninth edition of the *Annual Bibliography of Computer-Oriented Books*, published by the University of Colorado, contains 311 new entries.

J. Daniel Couger On Education

Notable in this year's listing is the improved quality of books on the subjects of data bases and structured programming.

All books prior to 1970 were deleted, except for a few classics such as Jordain's *Condensed Computer Encyclopedia*. Despite the deletions, the bibliography still contains over 1,000 books from 224 publishers.

Two categories were added to the previous 51 categories: data base, with 19 entries, and structured programming, with seven entries. In these categories the books by Date, *An Introduction to Database Systems*, and by Yourdon, *Techniques of Program Structure and Design*, will be appreciated by practitioners.

Continuing the trend of the past two years, the additions to the advanced programming category evidenced considerable improvement. Also, good books like Borztiss' *Data Structures* and Graham's *Principles of Systems Programming* were further improved by second editions. That section now contains 74 books.

In the system design category, the most significant change occurred in the section on feasibility, where four new books were published, including Frielink's *Economics of Informatics*.

Ten books were added to the system analysis category. The section on computer applications expanded by 17 entries.

DP Management

Until 1974 few good books were available on the subject of DP management. Five excellent books were published in 1974, and the 1975 additions of books like Benwell's *Benchmarking* and Bigelow and Nycum's *Data Processing Contracts and the Law* strengthened this category significantly.

The computer reference section lists the handbooks that should be a part of the computer library of every organization.

Over the years I've decried the shortage of APL books and the overproduction of Fortran books. Although the addition of 15 Fortran books to a section already containing 61 books was unnecessary, the section of 11 APL books is now a viable one.

Copies of the bibliography are available for $4 from *Computing Newsletter*, University of Colorado, Box 7345, Colorado Springs, Colo. 80933. The cost is $5 if an invoice is required.

Couger is professor of computer and management science at the University of Colorado.

Flexibility Added To 'Aset' Upgrade

BLUE BELL, Pa. – Aset 1.5, an enhanced version of Univac's Author System for Education and Training, is available for use on 1100 series CPUs.

The enhancements add real-time communications, graphics, microfiche display, interface with the APL language, improved security, language enhancements and other advancements to the original Aset, Univac said.

The addition of real-time communications capability expands the number and range of terminals (including both asynchronous and synchronous types) which can be used.

Aset 1.5 can be used with a microfiche projection unit for added capabilities, Univac said.

Graphic commands provide for the development of visual displays with an otherwise test-oriented lesson. Aset 1.5 is used in this mode with industry-compatible graphic terminals.

Aset 1.5 can be licensed for $375/mo. Available to all Univac 1100 series users under the 1100 operating system, Aset uses interactive Uniscope 100 and Uniscope 200 displays or other terminals compatible with the 1100 series.

Deltak Extends Course Lists

SCHILLER PARK, Ill. – The first three in a series of eight multimedia courses on IBM's Time Sharing Option (TSO) and a six-course IMS teleprocessing programming subseries are among products now available from Deltak, Inc.

Other training courses being introduced now include six on OS/VS utility programs, two on PL/I extensions, the first course of a series on structured design and a "refresher" course in "Programming Productivity Techniques" by consultant Ed Yourdon.

To benefit from the TSO series, trainees should have a basic knowledge of Cobol and a working knowledge of IBM's Job Control Language, the system catalog or Vsam catalog facilities, Deltak noted.

A working knowledge of the operating system, modular programming and the linkage editor would also be helpful, the company said.

Trainees taking the IMS teleprocessing programming courses should have experience in Cobol, PL/I or Assembler language. They should also have completed the first three subseries in the Deltak IMS series "or have similar experience with batch application programming," the vendor said.

The PL/I courses focus on indexed files in one instance and on regional files in the other. These courses assume the student is familiar with the concepts of indexed sequential or direct data set organizations, a spokesman said.

Deltak's course, which includes video cassette presentations, workbooks and "hands-on" exercises, are available under rental or purchase plans.

Deltak is at Suite 50, O'Hare Aerospace Center, 9950 W. Lawrence Ave., Schiller Park, Ill. 60176.

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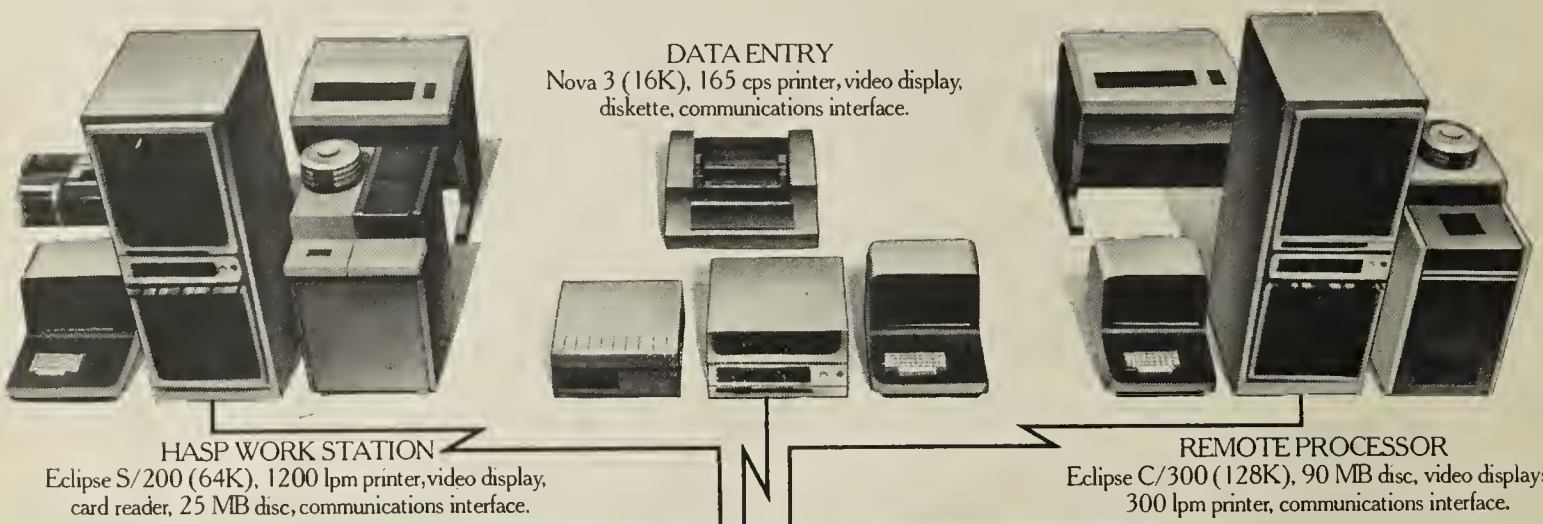

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REMOTE PROCESSOR
Eclipse C/300 (128K), 90 MB disc, video displays, 300 lpm printer, communications interface.

STORE AND FORWARD CONCENTRATOR
Eclipse S/200 (128K), multiplexor, 10 MB disc, communications interface.

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CONCENTRATOR
Nova 3 (64K), multiplexor, communications interface.

MESSAGE SWITCH
Eclipse S/200 (256K), video display, 800 bpi tape, multiplexor, 300 lpm printer, 90 MB disc, communications interface.

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Eclipse C/300 (256K), 90 MB disc, video display, 1600 bpi tape, channel adapter, communications subsystem.

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Norfield Enhances Dataspeed 40

EAST NORWALK, Conn. Norfield Electronics, Inc. has introduced an intelligent terminal control unit designed to enhance the capabilities of AT&T's Dataspeed 40 terminals.

The control unit is part of a front-end configuration, known as the System 400, which provides buffer storage and store-and-forward capabilities to the basic Bell terminals.

The System 400 adds programmable features and a floppy disk storage unit that can handle both Dataspeed 40 and compatible terminals. The system's data controller is based on a Data General Nova or comparable minicomputer and uses a Nova assembler language, a spokesman said.

The synchronous version of the system can run at speeds up to 9,600 bit/sec while the asynchronous version handles speeds up to 1,800 bit/sec for both Dataspeed 40 and teletypewriter compatible CRTs which can interface on an RS-232 level, the firm said.

A card module is available to allow a Dataspeed 40 system using a Norfield System 400 to transmit directly to the multiplexer channel on an IBM 370 mainframe in multidrop applications.

The System 400 handles half-duplex protocols now, but full-duplex Synchronous Data Link Control will be added, Norfield said.

Programmable capabilities include IBM's DOS and Fortran and Basic compilers.

A typical system with the data controller, a floppy disk, one synchronous port and eight Dataspeed 40s with the store-and-forward feature costs about $20,000.

A similar system of eight Dataspeed 40s purchased from Teletype Corp. costs about $14,000, but it would not be programmable and would have only binary synchronous capabilities; it also would not have the store-and-forward capability, a Norfield spokesman said.

In both cases the cost does not include the terminals. At present they can be leased only from N.Y. Telephone or purchased from Teletype.

The Bell System is limited to binary synchronous operation and would require dual controllers compared with one Norfield data controller in an eight-terminal system.

First deliveries of the System 400 data controller are scheduled for October, Norfield said from 3 Depot Place, East Norwalk, Conn. 06855.

ORI Change Lets PDP-11s Work As Standard Hasp Workstations

EUGENE, Ore. – Oregon Research Institute (ORI) has redesigned its DOS Hasp-11 remote batch terminal software for integration into the Digital Equipment Corp. RSX-11D operating system for DEC PDP-11 minicomputers.

The program replaces any standard Hasp workstation by using the multileaving linc protocol with data compression and transparency, ORI said.

It can also operate as a Hasp central station and communicate with other remote workstations, the company added.

The complement of 15 concurrent data streams plus a console stream are supported. DP11 and DU11 interfaces are supporteed for up to 9,600 bit/sec while DQ11 support is available for wideband applications, the company said.

The program was designed to run at a low priority, allowing real-time tasks to usurp control of the system, which will only degrade Hasp-11 throughput without disrupting communications, the firm said.

The program is divided into a core-resident task to handle all communications I/O and a checkpoint task to handle exceptional circumstances, such as stream initialization and status reporting.

This communication control program is delivered as a source module which interfaces to an operator terminal and directs the operation of the core-resident task, ORI said.

The program can be mofidied so that other tasks, rather than the operator, can control the workstation functions, the company noted.

The basic system supporting three concurrent streams and the psuedo-batch facility requires a core-resident task of approximately 7K words and a checkpoint task of approximately 4K words.

Prices start at $3,500 for single systems without DQ11 support. DQ11 support and sources are available at an additional cost of $1000 each, ORI said from P.O. Box 3196, Eugene, Ore. 97403.

DEC Adds Off-Line Tester

MAYNARD, Mass. – An off-line terminal tester which exercises serial Ascii teleprinters and CRTs using 20Ma current loop or EIA interfaces is available from Digital Equipment Corp.

The PMKO4 operates off-line, leaving the system running while the terminal is in test, the company said.

The PMKO4 costs $1,425 from DEC's Customer Spares Group in Maynard, Mass. 01754.

FCC Decision Opens Door For Overseas Dataphone

By Ronald A. Frank
Of the CW Staff

NEW YORK – AT&T may soon offer an international dial-up Dataphone service as the result of a recent Federal Communications Commission (FCC) decision.

Up to now AT&T has been prohibited from transmitting data over international dial-up facilities. The FCC ruling gave AT&T approval to file the necessary tariffs for such service.

The international service would allow users to transmit data in much the same manner that is now common for domestic dial-up data calls, according to Richard B. Nichols, vice-president of AT&T's overseas department.

At present a user who wants to transmit data overseas probably makes use of the Datel data service offered by the international record carriers (IRCs). The future AT&T data service will probably not be as good as Datel, however, because the IRCs offer specially conditioned circuits to support data, Nichols said.

AT&T plans to allow data transmission over standard voice-grade connections, but there will be other benfits to users, Nichols said. Under the projected international Dataphone service, for example, the user will be dealing only with the telephone company.

AT&T is now working with the IRCs to agree on automatic interconnection methods for providing international Dataphone, since Bell will still rely on the IRCs for nondomestic portions of the calls, Nichols said.

Can't Police Circuits

As Bell has provided more direct customer-dialed capability to foreign countries, it has become increasingly difficult to control the tariff prohibitions against data traffic, Nichols said.

"It is no longer possible for us to police the use of these circuits," he explained.

The international Dataphone service as described by Nichols would provide standard direct dial-up connections; the user would use modems and acoustic couplers in much the same way as he now does on domestic dial-up calls.

Because of the international facilities, which may be cable or satellite, effective data speeds may be lower in international Dataphone than in the U.S. A transmission speed of 9,600 bit/sec now possible on a domestic dial-up circuit may not be successful on international Dataphone, Nichols said.

Despite the favorable FCC ruling, it still may be some time before the tariffs for the international service go into effect, Nichols said. It is almost certain the IRCs will object to AT&T providing international Dataphone service, and AT&T has made no specific plans on when an appropriate tariff will be filed, he said.

AT&T Asks Delay In Ending DAAs

By a CW Staff Writer

WASHINGTON, D.C. – AT&T has asked the Federal Communications Commission (FCC) to postpone the scheduled April 1 start of a program designed to eliminate Data Access Arrangements (DAA) because it "could be accomplished only at enormous expense and effort."

The proposed rules issued by the FCC for instituting a program of certification and registration to replace the current Bell connecting arrangements [CW, Nov. 12] must be extensively revised because of technical deficiencies, AT&T said.

"These efforts will be necessary not because of any inadequacy of the design of the telephone companies' equipment, but because of the technical inappropriateness of the rules as adopted" by the FCC, AT&T told the commission.

Because of the sheer magnitude of the job involved, it would be impossible for the phone companies to provide registered data terminal equipment "until well after April 1," AT&T said.

At issue is that portion of the ruling which requires telephone companies to provide equipment that has been certified and registered to meet the same technical parameters as nontechnical equipment. The carriers have objected to having their equipment subject to FCC registration.

Bell said it was determined to "achieve the best possible interconnection program at the earliest possible time." A team of experts had been assigned within the Bell system to analyze the proposed FCC rules, AT&T said, but if the program is to go into effect on April 1, it would have to file the required tariffs by Feb. 1.

In addition the the AT&T request for a postponement of the rules, Rixon Electronics, Inc. filed a similar petition with the FCC.

Opposition to the postponement requests included statements sent to the FCC by the American Petroleum Institute, Independent Data Communications Manufacturers Association, Exxon Enterprises, Inc., the Computer Business Equipment Manufacturers Association, and the U.S. Justice Department.

The FCC is scheduled to reconsider its proposed rules at a meeting on Feb. 12, according to an FCC staff spokesman.

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DAY I – MONDAY, FEBRUARY 16

*9:30 - 12:30	*Applications; Manufacturing*
*9:30 - 12:30	*Applications; Service Industries*
*9:30 - 12:30	*Networks; Networking Revisited— Effect of New Facilities and Procedures*
*9:30 - 12:30	*Forum; Network Diagnostics*
*9:30 - 12:30	*Applications; Insurance*
10:00 - 11:30	*Workshop; Network Planning & Budgeting*
10:30 - 12:00	*Workshop; CPU's and DataComm Software*
*2:30 - 5:00	*Basics; System Planning & Administration*
*2:45 - 5:30	*Networks; Network Optimizing Techniques*
R3:00 - 4:30	*Workshop; Network Planning & Budgeting*
R3:00 - 4:30	*Workshop; CPU's and DataComm Software*
3:00 - 4:30	*Workshop; Communications Processors and Multiplexers*

** Signifies sessions with 30 minute break for reviewing exhibits and for refreshments*
R Signifies Repeat Sessions

DAY II – TUESDAY, FEBRUARY 17

R8:30 - 10:00	*Workshop; Communications Processors & Multiplexers*
*8:30 - 12:00	*Networks; Optimizing International Networks*
8:30 - 12:00	*Forum; Bringing DP Power Closer to the User — Role of Terminals*
*8:45 - 12:00	*Applications; Government*
*8:45 - 12:00	*Applications; Banking & Securities*
*8:45 - 12:00	*Applications; Energy Industries*
*9:00 - 11:30	*Basics; Data Transmission Services & Modems*
10:00 - 11:30	*Workshop; Network Implementation*
10:30 - 12:30	*Workshop; Remote-Batch and Data-Entry Terminals*
*2:30 - 5:00	*Basics; Data Terminals*
*2:45 - 5:30	*Networks; Minis in Distributed Networks*
*2:45 - 5:30	*Forum; Bringing DP Power Closer to the User — Role of Small Business Computers*
R3:00 - 4:30	*Workshop; Remote-Batch and Data-Entry Terminals*
3:00 - 4:30	*Workshop; Interactive CRT and Hard-Copy Terminals*
R3:00 - 4:30	*Workshop; Network Implementation*

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DAY III – WEDNESDAY, FEBRUARY 18

R8:30 - 10:00	*Workshop; Interactive CRT & Hard-Copy Terminals*
8:30 - 10:00	*Workshop; Modems & Couplers*
*8:45 - 12:00	*Applications; Hospitals and Health Care*
*8:45 - 12:00	*Applications; Computer Services*
*8:45 - 12:00	*Applications; Retailing/Wholesaling & Distribution*
*8:45 - 12:00	*Networks; Optimizing Data Entry in Distributed Networks*
*8:45 - 12:00	*Forum; Rap Session on Distributed Networks*
*9:00 - 11:30	*Basics; Data Processors & Software*
10:00 - 11:30	*Workshop; Network Management*
R10:30 - 12:00	*Workshop; Modems & Couplers*
10:30 - 12:00	*Workshop; Data Transmission Services*
1:30 - 3:30	*Networks; Role of Remote-Batch Terminals in Distributed Networks*
R2:00 - 3:30	*Workshop; Data Transmission Services*
R2:00 - 3:30	*Workshop; Network Management*

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43 Time-Sharing Network

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Centralize Order Processing

CRTs in Network Take 'Bite' Out of Candy Inventory

By John P. Hebert
Of the CW Staff

BEDFORD, Mass. – A candy manufacturer headquartered here has taken the bite out of inventory overstocking and billing problems with an order-processing system which utilizes intelligent terminals.

"Candy is a perishable product with a seasonal sales pattern, and the whole idea is to keep inventories as low as possible and still satisfy customers," according to Bob Reintges, DP manager for Fanny Farmer Candy Shops, Inc.

To meet this objective, Fanny Farmer developed a central order-processing system (Cops). Cops replaced a regular order and billing system (known as Robbers) in which warehouse distribution points in Fairfield, N.J., Hopkins, Minn., and Norwalk, Ohio, handled their own order-processing functions.

Before the intelligent terminals were installed, Reintges recalled, three people at each warehouse and at headquarters processed an order.

Now five people are employed at the Bedford site to handle the complete processing of orders, but greatest savings from Cops are in terms of efficiency, Reintges said.

"We have the ability to update a centralized information system, along with a decentralized shipping system to reduce transportation costs," he explained.

With Cops, the company has complete information on inventory, shipments, warehouse movement, customer credit and sales analysis, he added.

Customer orders are sent from the three distribution points to headquarters, where they are keyed into Sycor, Inc. Model 340 intelligent terminals.

The orders are edited for routine data and fed into the company's Honeywell 115 computer, which has 32K bytes of storage, four tapes and two Model 172 disks.

The CPU holds the order in queue until the correct release date is met, generating an output tape for the terminals at each distribution center.

At 4 a.m. the tape is transmitted at 1,200 bit/sec from the Bedford terminal running in batch mode through a Bell 201 modem on dial-up, outgoing Wats lines.

The terminals at the distribution points receive the data and, through an autoprint feature, print out the information on picking and shipping documents with a Centronics Data Computer Corp. printer on-line to the terminals.

By 9 a.m. warehouse personnel receive all the information needed to complete shipping orders for the day, as well as an inventory status report, a recap of orders sent and warehouse shipment information, Reintges said.

Confirmation information, keyed in at the warehouses, is polled by the terminal at headquarters. This encapsulated information triggers complete billing information and a sales analysis, he said.

Terminal Transactions

"We transmit as little confirmation information as possible to cut down on transmission costs and reduce the possibility for error," he explained.

The consolidated manufacturing and warehouse/distribution facility in Ohio also receives a daily inventory report, which is used for production scheduling.

Upon completion of a shipment, a warehouse operator transmits the shipping notices to Bedford to show what was shipped, who received the shipment and the date and carrier used.

There is enough room for expansion on the present order-processing system, Reintges said, that he's thinking of sending and receiving the company's entire payroll on the terminals.

At present, the Bedford facility receives company payroll information from Telex transmissions and through the mail. With the intelligent terminals, however, the warehouses could transmit the data to Bedford and load it directly on the computer, he explained.

"It would merely involve redoing the existing system," he said.

User Group Slates First Meeting in Feb.

WALTHAM, Mass. – The first national meeting of the Association of Data Communications Users (Adcu) will be held at 5:30 p.m. on Feb. 17 at The Rivergate Convention Center in New Orleans during the DataComm 76 conference.

The following objectives for the association were established by the Steering Committee:

- Sharing knowledge, experiences and resources.
- Establishing directions for vendor product and service development.
- Developing procedures for acquiring, reviewing and disseminating information on governmental actions and vendor plans.
- Promoting the effective use of data communications.
- Exploring the problems of standards in job functions, work activites, professionalism and training.
- Suggesting and encouraging research.

Objectives, the by-laws, membership requirements and other details have been the subjects of committee meetings held in anticipation of the national assembly in New Orleans, where prospective members are invited to discuss association details.

Committee members include users from Equitable Life Assurance Society, American Airlines, Securities Industry Automation Corp., Mobil Oil, Cranston Print Works Co., Chase Manhattan Bank, Data Resources, Inc., Eastman Kodak Co. and PPG Industries.

Additional information is available from the Adcu Steering Committee, P.O. Box 915, Waltham, Mass. 02154.

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CDC Stand-Alone Display Has Detachable Solid-State Keyboard

MINNEAPOLIS – Control Data Corp. has introduced a modular stand-alone OEM display terminal with solid-state keyboard.

The microprocessor-based CDC 92451 terminal has plug-in options which permit expansion from a basic terminal to a terminal subsystem offering hard-copy output, bulk storage of data, editing and automatic answerback.

The keyboard is detachable from the 12-in. CRT display; this allows the 92451 display to be mounted in normally inaccessible locations, CDC said.

The 95-key solid-state keyboard includes a typewriter layout, an 11-key numeric pad, four function keys, 32 control codes, N-key rollover and switch-selectable 64- and 96-character Ascii.

The CDC 92451 reportedly can tie into any CPU or group of minicomputers and can receive data from single or dual tape cassettes as well as its interactive keyboard.

A printing capability is offered by either an impact printer system (180 char./sec) or a nonimpact printer (30 char./sec) system. The terminal transmits at 10 switch-selectable speeds from 110- through 9,600 bit/sec.

The basic unit displays 960 characters in 12 lines of 80 characters, while a memory expansion card gives a 24- by 80-character display.

The terminal costs $2,250 from CDC at 2401 N. Fairview, St. Paul, Minn. 55113.

Terminal Transactions

Megadata Adds Intelligent CRT

BOHEMIA, N.Y. – Megadata Computer and Communications Corp. has introduced an intelligent CRT terminal which incorporates a 12-bit internal MOS LSI/MSI processor.

The Model SIR1000/TS can transfer information at an optional data rate of 300 kbit/sec and also has eight transmission speed options ranging up to 9,600 bit/sec, a Megadata spokesman said.

Communications protocols include synchronous, asynchronous and bisynchronous modes. Because it is an intelligent terminal, "it can interface to almost any terminal or system in the industry," the spokesman said.

The terminal performs touch-screen operation through a Megadata process termed "Display Surface Wave Reflection." By pulsing two rows of piezo-electric transducers with a signal, a wavefront in vertical and horizontal directions is propagated across the surface of the CRT faceplate, Megadata explained.

When any firm object is pressed on the faceplate, a reflected wave is created by the disturbance of the wavefront, providing "disturbance" position data, the company said.

The SIR1000/TS is priced from $8,500 to $12,000 depending upon capabilities, the spokesman said from 35 Orville Drive, Bohemia, N.Y. 11716.

CRT Module Package Available

LOS ANGELES – An OEM CRT module for display of alphanumeric information has been introduced by Western Electromotive/Shephard, Inc.

The module package contains a CRT, deflection circuits and vertical, horizontal and video amplifiers. Power for the units can be supplied by an external DC source or AC line voltage.

The package features all-transistorized construction except for the CRT.

A 6-in. module, available now, is priced at $65 in quantities of 5,000. A 12-in. module will be available in the third quarter for less than $80 in the same quantity, the spokesman said from 12421 W. Olympic Blvd., Los Angeles, Calif. 90064.

Digest to Study Distortion

FORT WASHINGTON, Pa. – Envelope-delay distortion and its effect on high-speed data transmission will be the focus of the second issue of *Modem Digest*, published by Tele-Dynamics.

Subscriptions to the quarterly publication are available free from the company at 525 Virginia Drive, Fort Washington, Pa. 19034.

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While Keeping 370s for Batch

Decsystem-2040 Customers Plan On-Line Applications

By Patrick Ward
Of the CW Staff

Two of the first customers for Digital Equipment Corp.'s recently announced Decsystem-2040 [CW, Jan. 19] plan to use their machines for on-line applications while they continue to run most batch work on IBM 370/125s.

Marshall's Department Stores of Woburn, Mass., for example, currently uses a 192K 370/125 to handle merchandising, financial and some batch distribution applications.

The company wanted to go to an on-line distribution system with up to 50 terminals, but decided it would have to upgrade to a 370/145 if the batch and on-line applications were to run on the same machine, according to William W. Mowbray, director of management information systems.

Instead, Marshall's decided to handle the on-line applications on either a dedicated Data General Eclipse C-300 or a DEC PDP-11. Since the company's batch workload was growing too, the company planned to upgrade to a 135 this spring.

DEC then proposed a Decsystem-2040, which Marshall's decided would be a better choice than the original plan.

"It gives us the best of both worlds," Mowbray said. "It will handle on-line work most efficiently and take over a portion of our batch workload as well.

"We know we will be able to off-load a sufficient amount of batch work onto the 128K 2040 to avoid the upgrade to the 135," he added.

There is a "distinct possibility" the 2040 will be able to both handle the on-line applications and replace the 125 as a batch processor, Mowbray said.

However, Marshall's plans to keep the 125 for at least the rest of the year because the on-line system won't be fully operational nor the 2040's extra capacity known until then.

Mowbray has seen DEC run a comparative benchmark between other mid-scale CPUs and the 2040, but wouldn't divulge the results. "From a price/performance standpoint, we're very excited about the 2040," he said.

Marshall's currently has two in-house CRTs linked to a Decsystem-10 for program development work. Mowbray sees "no problems whatsoever" in converting the 125's Cobol batch financial applications to run on the 2040.

"It will mostly be a matter of changing SELECT statements, he said.

The support people from DEC's Large Computer Group show "a much higher level of expertise in the commercial environment" than DEC's minicomputer support people, Mowbray said.

Hospital Plans System

Another early Decsystem-2040 customer, the City of Boston's Department of Health and Hospitals, wanted to launch an on-line clinical information system on a dedicated computer. It planned to continue doing batch work on its 162K 370/125.

The department's request for proposals drew bids from turnkey vendors and

(Continued on Page 21)

Tesdata Designs Monitor for Big CPUs

McLEAN, Va. – Designed for large-scale computer users, Tesdata Systems Corp.'s MS-88 Model III performance measurement system has its own foreground/background operating system, a 64K-byte minicomputer and 48M bytes of disk storage.

Like other hardware monitor systems, the MS-88 Model III was developed for users who want to gauge their mainframe's capacity, fine-tune it and better schedule the jobs that run on it, a Tesdata spokesman said.

The MS-88 models I and II allow the user to either monitor the mainframe or process the measurmenet data, but not at the same time, the spokesman noted.

The Model III's TDOS III multitasking operating system, however, allows it to simultaneously control the measuring process in the foreground and do data reduction or other tasks in the background.

The Model III user therefore does not have to interrupt a long-term monitoring process in order to do data reduction or produce management reports from the measurement data he has acquired, the spokesman said.

Summarizes Selected Data

The Model III's 48M-byte disk capacity (compared with 2.5M bytes on the Model II) allows it to summarize selected data into the data base while it continues to record all the detailed information, he added.

This allows the system to give the analyst real-time information about the mainframe's performance anytime he requests it, the spokesman said.

The data base could also contain the past month's performance data so the analyst could identify trends and fine-tune of the system, according to Tesdata.

The data base has been set up so users with multiple computers have the ability to build separate data bases for each system. Since the Model III processes the data it collects, it is host-independent and works with any CPU, the spokesman added.

The standard MS-88 Model III configuration includes 144 sensors with associated cables and concentrators; eight collectors; a 32-bit comparator; a console CRT and keyboard; a minicomputer with 64K bytes of memory; a graphic printer and display; and 48M bytes of disk storage.

Standard software includes TDOS III, measurement software, management reporting software, data reduction software, working set monitor and program development software.

The MS-88 Model III costs $166,000. Lease plans are available and deliveries will begin in May from the firm at 7900 Westpark Drive, McLean, Va. 22101.

EMM 370/158 Add-On Memory Locates Failures for Operator

HAWTHORNE, Calif. – Electronic Memories and Magnetics Corp.'s (EMM) static semiconductor add-on memory for the IBM 370/158 has a display panel designed to help the operator reconfigure the memory after a failure.

Called the Multimemory/158, the EMM memory is built around static, 4K NMOS random-access memory (RAM) chips.

The memory can be installed on all versions of the 158, including Model 3 and multiprocessor systems, up to a system total of 4M bytes, EMM said.

If any segment of the EMM or IBM memory should fail, a red light on the display panel shows the operator which 512K memory section has failed, an EMM spokesman said.

By flicking a switch for that section, the operator can cause the failed memory block to be automatically removed from the system and storage address continuity to be restored. The operator can then reload the system and run it until the failed memory segment is repaired, the spokesman said.

The fact that the Multimemory/158 is static (like the IBM memory on the 158) rather than dynamic makes it easier for maintenance people to find failing chips, the spokesman added.

The static system also uses less electrical power because it does not require refresh hardware, he said.

The memory has the same speed as the IBM memory. Error detection and correction are standard features, EMM said.

The Multimemory/158 costs from 37% to 45% less than the IBM price depending on the memory size and financial and maintenance plans the user selects, the company said. Company spokesmen, however, would not provide dollar figures.

Deliveries will begin in the second quarter from the firm at 3216 W. El Segundo Blvd., Hawthorne, Calif. 90250.

Entrex Adds Remote Key-to-Disk

BURLINGTON, Mass. – Entrex, Inc.'s System 180, the company's lowest priced key-to-disk system, is a remote data entry product aimed at distributed data entry networks, the company said.

The System 180 includes a 48K-byte processor, communications controller, a 2.4M-byte disk with removable pack and up to four local or remote Data/Scope keystations.

The system can support various printers with speeds up to 600 line/min and a 300 card/min reader.

The System 180 allows concurrent data entry, preprocessing, 1,200- to 9,600 bit/sec data communications and formatted report generation, Entrex said.

The system has a data entry and preprocessing operating system as well as the vendor's Datacomm communications software package, which allows emulation of the IBM 2780, 3780, 2770 and 3741 (models 2 and 4) terminals and the 3747 data converter, Entrex said.

The System 180 is software- and communications-compatible with Entrex's 280, 380, 480 and 580 systems.

A single-keystation System 180 costs $575/mo on a three-year lease and $623/mo on a one-year lease. A four-keystation system costs $728/mo on a three-year lease and $788/mo on a one-year lease, including maintenance, and can be purchased for $29,600.

Delivery is 60 days from the firm at 168 Middlesex Tnpk., Burlington, Mass. 01803.

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MSI Has Off-Line Workstation For Data Entry at Remote Sites

COSTA MESA, Calif. – The Source 7600 from MSI Data Corp. is a programmable off-line remote data entry workstation, according to the firm.

Each workstation can approximate the I/O performance of an on-site minicomputer system, remote batch terminal or on-line entry terminal, the company said.

The 7600 incorporates an Intel 8080 microprocessor which is permanently programmed with a set of basic programming commands to allow the on-site, nontechnical operator to create original formats for data input.

MSI Source 7600 Workstation

A Free Form mode allows the terminal to accept and then transmit narrative, unformatted data as well, so that special instructions and other messages can also be communicated to and from the computer center, MSI said.

One cassette drive is standard; a second cassette is optionally available for loading programs, editing and duplicating cassettes.

The machine incorporates both a full typewriter keyboard and a separate 10-key pad for rapid entry of numeric data. A 32-position LED display permits the operator to edit each line of data before it is printed on the 32-character journal tape.

An external line printer can be interfaced to the Source 7600 for on-site generation of full-page printouts and automatic completion of forms, invoicing and other records.

Four internal accumulators, together with the Source 7600's arithmetic capability, can accommodate accounting data, the company said.

Source 7600 terminal inputs are received at the computer center by MSI's Data System IV, which records all inputs on magnetic tape for subsequent input to the computer.

The Source 7600 costs from $3,500 to $4,500. Deliveries will begin in April from the firm at 340 Fischer Ave., Costa Mesa, Calif. 92727.

On-Line Work Slated For Decsystem-2040s

(Continued from Page 19)

service bureaus, but a bottom-of-the-line Decsystem-10 with a KA-10 CPU seemed to be the best choice for price, performance and growth capability, according to Michael T. O'Connor, director of management information systems.

Last November, however, DEC mentioned the Decsystem-20 series to the department. "It has everything the 10 had, plus some," O'Connor said.

The 2040 is faster than the KA-10 system (which DEC no longer manufactures), has additional hardware instructions for business DP and has more disk capacity with a faster transfer rate, he added.

The on-line system will serve not only Boston City Hospital but clinical areas in other health institutions under the city's jurisdiction.

The department's plans call for programmable data loggers to accept data on-line from various lab instruments. The medical staff will use 10 CRTs and four Decwriter terminals to enter patient-related information and inquiries, O'Connor said.

As a byproduct, the 2040 will collect accounting information on tapes that will run on the 125, O'Connor said.

Implementation should save the department about $120,000/year in keypunching, overall clerical costs and lost billing, O'Connor estimated. It will also be able to provide cumulative test results and benefit patients in other ways, he said.

"We are not currently planning to have the 20 handle any batch processing," O'Connor said.

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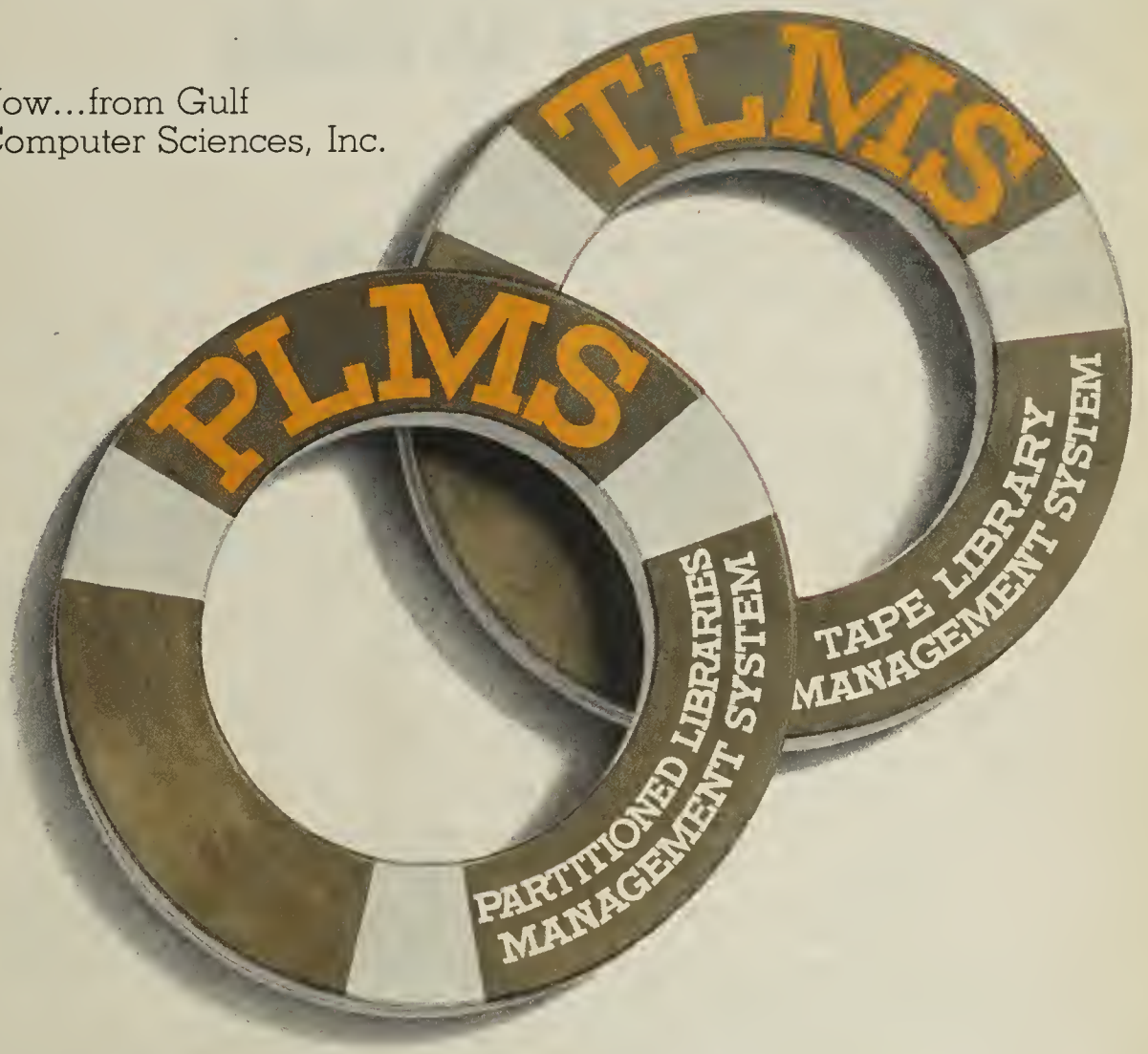

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Calcomp Table-Top Model 836 To Replace 563 Drum Plotter

ANAHEIM, Calif. – California Computer Products, Inc. (Calcomp) has introduced the Model 836 drum plotter to replace its 563 drum plotter.

Calcomp 836 Drum Plotter

The advantages of the 836 are said to include plug compatibility for on-line operation with any CPU having an asynchronous EIA RS-232C connection or a Calcomp 500 series interface.

The 836 is suited for producing engineering design drawings, subdivision maps and Pert charts, Calcomp said.

In addition to on-line operation, the table-top 836 can be driven off-line by any Calcomp 900 series controller.

DC servo motors drive the plotter's drum and carriage for quiet operation, and a linear motor pen mechanism eliminates pen noise, Calcomp said.

The 836 costs $8,700, including one year's service. Lease plans are available from the firm at 2411 W. La Palma Ave., Anaheim, Calif. 92801.

COM Seminar Set

WASHINGTON, D.C. – AMR International, Inc. will hold a three-day seminar on computer output microfilm (COM) at the Sheraton National Hotel here March 8-10.

The first day of the seminar, called "Micrographic Systems – Microfilm/COM," will look at fundamental microfilm concepts. The second day will include sessions on retrieval systems and the design of micrographic systems.

The final day will concentrate on COM applications, software and operation and system design.

The workshop will end with sessions on COM in the systems framework, and on the current development of computer-input-microfilm, AMR said.

Fee for the seminar is $450, AMR said from 1370 Ave. of the Americas, New York, N.Y. 10019.

Mich. Agency Offers Three-Day Workshop On In-House Security

WESTLAND, Mich. – The Computer Security and Investigative Agency, Inc. (CSIA) here is offering users education in computer security to reduce both DP crime and accidental loss of data.

The firm, whose staff consists of DP professionals as well as former law enforcement officers has a three-day in-house computer security workshop.

Workshop Content

The workshop focuses on DP controls and procedures; communications and wiretapping; cryptography; computer crime; and DP auditing and insurance considerations, as well as security management considerations.

Facility and site planning, personnel considerations, privacy and legal considerations, physical security and access control are also covered by the course.

Services offered by CSIA include contingency/emergency planning and project management, including planning, design, implementation and postimplementation review.

The firm also does computer site security surveys, a spokesman noted.

CSIA is at 34677 Fountain Blvd., Westland, Mich. 48185.

Unit Cleans, Verifies IBM-Type Cartridges

WOODLAND HILLS, Calif. – The CMS-IV magnetic disk cartridge cleaner/verifier from Data Devices International, Inc. can handle both top-load (IBM 5440-type) and front-load (IBM 2315-type) cartridges, the vendor said.

The CMS-IV costs $1,995. A cleaner-only version costs $1,495 from the firm at 6325 DeSoto Ave., Woodland Hills, Calif. 91364.

DDCC Introduces Keyboards For Its 80-Column Systems

HORSHAM, Pa. – Decision Data Computer Corp. (DDCC) has introduced five optional keyboards with corresponding print wheels for its 80-column data recorders and data communication system.

The keyboards are Fortran/Cobol, Honeywell Standard, Ascii, Univac 400/1100 and Univac 1004.

Several foreign language keyboards are available on special order, the company noted.

Each of the keyboards carries a one-time charge of $150. Deliveries will begin in the second quarter from the firm at 100 Witmer Road, Horsham, Pa. 19044.

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A list of current seminars is given below. To register for any seminar, or if you'd like more information, just check the appropriate box and send in the coupon.

How to Increase Programming Productivity
A 2-day seminar for technical managers on new analysis, design, and implementation methods and how to manage them better. Led by John W. Brackett, PhD, Vice President of SofTech, Inc., and Prof. Clement L. McGowan of Brown University. Fee: $300, including continental breakfasts, luncheons, and all course materials. $250 for additional registrants from the same company. Schedule:

Chicago	**Hyatt Regency O'Hare**	**March 8-9**
Wash., D. C.	**Stouffer's National Center Inn**	**April 6-7**

Legal Tools for Computer Contracting and Protection
A 2-1/2 day seminar that shows you how to increase your advantage in dealing with vendors that supply your installation. Includes discussion and review of your own contracts. Led by Roy N. Freed, the nationally known lawyer, author and educator in the field of computer law. Fees: $325, including continental breakfasts, luncheons and all course materials. $275 for additional registrants from the same company. Schedule:

Wash., D.C.	**Marriot Crystal City**	**Feb. 4-6**
Orlando, Fla.	**Sheraton Towers**	**Feb. 18-20**
Seattle	**Airport Hilton**	**May 19-21**

Performance Evaluation and Improvement
A 2-day seminar on measurement techniques that are designed to save your installation money. Led by Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement and improvement.* Fees: $250 per registrant, including continental breakfasts, luncheons, and all course materials. Schedule:

New York	**Summit Hotel**	**Feb. 9-10**

Data Communications Course #1010 - Practical Data Communications Systems & Concepts
A 2-day seminar on the newest advances in data communications, including SDLC, DDS, new tariffs, equipment characteristics, and the impact of satellite carriers. Led by Dr. Dixon Doll, Teleprocessing consultant. Fees: $350, including continental breakfasts, luncheons, and workbook and reference materials. $300 for additional registrants from the same company. Schedule:

Chicago	**Hyatt Regency O'Hare**	**Mar.15-16**

Data Communications Course #1020 - Advanced Teleprocessing Systems & Concepts
A follow-up to course #1010, this 3-day seminar emphasizes techniques that minimize operating costs in commercial data communications networks. Also led by Dr. Dixon Doll. Fees: $450, including continental breakfasts, luncheons, and an extensive set of customized course materials. $400 for additional registrants from the same company. Schedule:

New York	**Essex House**	**Feb. 23-25**

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Mini Bits

Occidental Billing System Handles Patent Accounting

NORTH HOLLYWOOD, Calif. – A minicomputer-based patient billing and accounts receivable system called Medimac is available from Occidental Computer Systems, Inc.

The system features a family/patient master file with information on up to nine dependants as well as insurance company data and financial information, the firm said.

Medimac is configured on either a Lockheed System III, Cincinnati Milacron 2200, Datapoint 2200 or IBM System/3 mini with 24K words of core. It has a 60 line/min printer and one CRT and includes RPG-II software. Medimac sells for $46,000.

The firm can be reached at 10202 Riverside Drive, North Hollywood, Calif. 91602.

HP Has Laboratory System

APLO ALTO, Calif. – Hewlett-Packard Co.'s (HP) mini-based laboratory automation system, the HP 3354A, is a turnkey system that can perform all the calculation procedures used by the chromatographer, the firm said.

The system is based on the HP 21MX mini with 32K words of memory, a moving-head disk with 15M-bytes of storage, a paper tape reader, instrument interface module and a system console.

Up to 11 I/O devices can be attached to the system.

The HP 3354A is priced at $51,250 from 1501 Page Mill Road, Palo Alto, Calif. 94304.

European Group Seeks U.S. Users

PFREIMD, W. Germany – Igma, the European users organization of Management Assistance, Inc. Basic/Four systems, is interested in an exchange of thoughts with American Basic/Four users.

The organization can be reached at 8473 Pfreimd, Zimmermannstrasse, Germany.

Adapso Sponsoring Seminar

MONTVALE, N.J. – The Association of Data Processing Service Organizations (Adapso) will hold a seminar on the use of small business computers in San Francisco on Feb. 9-10.

The seminar will emphasize commercial, business-type applications use; standalone systems, distributed processing, data bases and dispersed data entry/validation; and development of long-term customer relationships, Adapso said.

Cost for Adapso members is $100 and $150 for nonmembers. Adapso is at 210 Summit Ave., Montvale, N.J. 07645.

For First-Time Users

Matrix Printer Featured With NCR 499

By Esther Surden
Of the CW Staff

DAYTON, Ohio – The NCR 499 general-purpose minicomputer, the successor to the firm's 399 system released in 1972, incorporates matrix printer technology not found in 399 systems, a company spokesman said.

Designed for first-time users, the NCR 499 was introduced with a series of 15 industry-oriented application packages that take advantage of the 499's additional features, the spokesman added.

"We are offering two and a half times faster printer performance for about 3% to 5% above the 399 price, depending upon the configuration chosen," he said.

A basic 499 system includes a 12K-byte processor, a bidirectional 75 char./sec impact matrix printer, one magnetic tape transport and a forms handler for $17,900.

Data is entered through standard alpha and numeric keyboards, NCR said. Memory can be expanded to 32K bytes and up to four 800 bit/in. magnetic tape cassette transports can be added.

Other optional features include a magnetic ledger capability with hard-copy records and electrically encoded information on the same document; a continuous forms feeder; automatic line find that positions forms to the correct posting line; and rear eject that places completed magnetic ledgers in a receiving tray.

The NCR 499, sueeessor to the 399, offers a matrix printer to first-time users.

The 499 can accommodate a variety of peripheral devices including line printers with speeds up to 300 line/min, a 300 card/min card reader and a magnetic disk unit with fixed and removable disks that have a combined 9.8M-byte capacity.

The operating system for the 499 is Neat-AM, the same as for the 399, and applications for the 399 can be used with the system, NCR said.

Applications packages for the 499 are available for retailers, banks, hospitals, government offices, trucking companies, accountants and manufacturers, according to NCR.

The 499 can also be used as an intelligent terminal in real-time or remote batch communications environments, NCR said, and can communicate with other 499s, NCR Century computers and most non-NCR systems. This is accomplished through special communications software supplied with the system, the spokesman said.

Deliveries are expected to begin in March. NCR will continue to support the 399 systems, the spokesman said from Dayton, Ohio, 45409.

Datapoint Packages Datashares, Says Users Can Save Up to 35%

SAN ANTONIO, Texas – Datapoint Corp. is offering its Datashare time-sharing business systems in four prepackaged configurations that represent "as much as a 35% cost saving over buying the individual components," a spokesman said.

The four systems are the 4220 and 4240, based on Datapoint 2200 processors, and the 4520 and 4540, based on the Datapoint 5500 processors.

The systems vary in memory size, virtual memory capacity, disk size and the maximum number of user terminals that can be attached to each, Datapoint noted.

A 4220 with a 16K memory, 5M bytes of disk storage, a 128K virtual memory and the maximum of eight terminals costs $1,393/mo on a two-year lease plan including maintenance.

The 4240, which includes the same configuration as the 4220 but with 40M bytes of disk storage, costs $1,948/mo under the two-year lease plan.

A 4520 system with a 48K processor, 5M bytes of disk storage, a 512K virtual memory and eight terminals costs $1,630/mo on a two-year lease that includes maintenance. Up to 16 terminals can be added to the system.

The 4540, with 50M bytes of disk storage, costs $2,279/mo under the same plan, the firm said from 9725 Datapoint Drive, San Antonio, Texas 78284.

Mini Keeps Publishers Records

By a CW Staff Writer

NEW YORK – A small business system is helping the publisher of the *Guinness Book of World Records* keep its royalty, sales and inventory records in order, the user said.

Sterling Publishing Co. maintains more than 700 titles in print in addition to the Guinness book. Before the mini was installed, the most complicated and time-consuming operation had been royalty accounting, according to Lincoln A. Boehm, Sterling's director of marketing.

"It was a function that did not fit easily into normal bookkeeping procedures," he said, explaining "we have contracts with each author that gives him either a percentage of the wholesale selling price of a book or a varying percentage based on the retail price of the book and dependent on the discount given the book dealer."

Sterling ran the royalty job on cards before it bought the mini, he continued. "Someone had to take the cards and figure out totals and the job took five or six weeks, twice a year. The whole process now takes about an hour and a half on the printer."

The records management aspect has been a constant problem for publishing companies with sales of less than $15 million a year, he said.

Sterling writes over 130 12-line invoices per day to about 6,000 customers. The system prepares the invoices, performs prebilling, two-step order entry, inven-

(Continued on Page 24)

Primesharing:

A virtual memory Prime 300 is like having up to 31 separate computers in one box. Each user has access to a complete virtual computer system that includes a processor with microprogrammed floating point arithmetic; high-speed disk file storage; 128k bytes of 600 nanosecond access MOS main memory; FORTRAN, BASIC and Assembler languages. Users can simultaneously develop real-time application software, handle data base management, execute complex computational programs, develop microprograms for the system's writable control store...and more. Write or call Prime for full details.

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Actuaries Say T/S Can't Compare to Dedicated Mini

By Patrick Ward
Of the CW Staff

An insurance firm's actuarial department believes there is "no comparison" between its dedicated minicomputer system and the time-sharing service it had previously used.

The mini system, a 32K Harris Corp. Slash 4 running under the Vulcan operating system, leases at about $3,000/mo.

The actuarial department had previously paid $5,000/mo to General Electric for time-sharing service, according to the user, who wished to remain anonymous.

"We have two more terminals than we had before; we have a line printer; there's just no comparison," the user said.

"Before, we rejected jobs because they would have taken too much time on the time-sharing system," he added.

"Nowadays we don't mind letting the mini run four or five hours." The mini is a multiprogramming system, so the department can run other jobs at the same time, he added.

The department's jobs are typically actuarial simulations, "the kind of thing that can eat up CPU time," the user said.

The department considered doing this sort of work on the company DP center's IBM 370/135, but a benchmark job on the 370 took 45 minutes of computer time. The Harris mini performed the same benchmark in 17 minutes, the user said.

Five years ago the actuarial department used desk calculators. The corporate CPU at that time did not have the capability to handle on-line terminals.

The actuarial department then moved into time-sharing, with favorable results.

"We had more and more people in the actuarial department intrigued with [computer-assisted] research," the user said. "They saw what good it was doing the company and they wanted to do more."

"But when we saw what was happening to our costs and that we wanted to do more rather than less research, we started looking around for another alternative," the user explained.

"The idea of having our own minicomputer with a fixed cost, no matter how much time we used it, had a lot of appeal," he said.

Conversion No Problem

The actuarial department brought in the Harris mini a year ago. Conversion of the Fortran programs the department had written for time-sharing use was not much of a problem, the user said.

The department continues to do all its programming in Fortran.

"At first we couldn't keep the minicomputer busy," the user said. "We're now selling time to some people outside the company."

The department's decision to bring in a computer of its own did not win a warm greeting from the corporate DP department, the user said.

The Harris minicomputer is an Ascii machine, the user noted.

"We wanted DP to convert its IBM-compatible tapes for our use, but they said something like, 'you have your own computer, take care of your own problems,' " the user said.

The actuarial department called in a Harris programmer who wrote some machine language code that allows the machine to use the DP department's tapes.

So far, service on the minicomputer has been excellent, the user said. The insurance firm is based in a university community where there are several other Harris users, he said.

Reliability has also been very satisfactory, the user added.

Are you re-inventing the wheel?

A special report on *Software Packages* in the February 23rd issue of *Computerworld*.

"Do it yourself" can be bad advice for your programmers, when you can buy ready-made software that does the same job as well or better than the program you write yourself. A growing number of users have switched to packaged software for just this reason - and they have saved the time and expense of duplicating software for standardized applications.

We'll be analyzing these labor saving software packages in the February 23rd issue of *Computerworld*. We'll show you how to locate, select and evaluate the best software for your needs. Edited by Don Leavitt, this special report will include user experiences and tutorials on topics like these:

Information sources for locating packages -
Periodicals, references and direct mail;
DP professional groups;
Trade shows.

Selection criteria -
Definitions of various criteria;
Comparison of techniques for evaluating system, utility and application packages;
Trial periods - are they available, or of any value;
Vendor-named users - are they of any value.

Installation methods -
Packages installed by mail or with on-site support;
Training and customization for other packages;
Post-installation audit - does the user have this option, and can the package be returned;
Paid in full vs. monthly lease - advantages and disadvantages of each.

Future directions of the software industry.

If you're involved with programming and analysis at your installation, you should be reading this special supplement in the February 23rd issue of *Computerworld*. And if you're a software vendor, you should be advertising here. Don't miss the February 6th ad closing. Contact your *Computerworld* salesman for all the details. Or call Judy Milford at (617) 965-5800.

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'Energy Saver' Helps Reduce Consumption

DETROIT – A minicomputer-based energy management and control system is designed to help reduce both peak demand and electrical consumption, according to Systems Technology Corp.

The system, called "The Energy Saver," has the ability to review its own actions and results and can reduce electrical bills from 10% to 20%, the firm said.

The system includes a CPU with 32K 16-bit words, battery backup, a digital input and digital output controller, a digital input module that can control up to 16 points, a digital output module, pulse counter, a tape cassette storage unit, teleprinter and cabinet as well as special software.

The system costs $25,000. First deliveries are expected to begin in March from the firm at 18916 Grand River Ave., Detroit, Mich. 48223.

Mini Keeps Records For Publishing Firm

(Continued from Page 23)

tory control, accounts receivable and sales analysis in addition to the royalty accounting.

Before purchasing the mini, the firm used a combination of a service bureau and a Friden business machine. The service bureau produced sales and statistical reports while the machine handled the company's accounting functions.

Outgrew the System

But "we had outgrown this system," Boehm said, and the firm looked at more advanced Friden machines before deciding to go with the Basic/Four Corp. Model 400.

"The mini was capable of doing what we wanted without a lot of unnecessary additional capabilities and, at the time we were looking, seemed a great deal less expensive" than others Sterling considered. "Also, no one in New York City had the machine, so we thought we'd get better service as one of the first installations here," Boehm said.

One operator can now do billing that took two billing machines, the accounting functions previously done by a service bureau and the royalty functions, he said.

"We also have a perpetual inventory for the first time, resulting in fewer out-of-stock books," he added.

When purchased about three years ago, the system cost the company about $35,000 including software, Boehm said. The firm has a Basic/Four Model 400 with a printer, two video display units and two disk drives. One display and one disk drive were added as upgrades to the system after the system was bought.

Handles Inventory Control

Dedicated Mini Meets Special Needs of Apparel Firm

Special to Computerworld

SOUTH PASADENA, Calif. – A manufacturer of children's and women's sports- and swimwear here is using a minicomputer-based dedicated system to meet its inventory control needs.

Special apparel-industry problems include extremely small timeframes in which to hit certain seasonal markets, rapidly changing consumer preferences, market saturation and great variety in color, size and style.

To cope with these problems, Daisy of California installed a specialized system over a period of three years.

Consisting of Qantel Corp.'s System 1200 processor with 48K words of memory, six fixed and removable disks, one 300 line/min printer, three CRTs and one 30M-byte disk drive, the system cost the firm approximately $85,000.

When the original software vendor and a successor both faltered, Qantel took over the corporation's software development.

The bulk of Daisy's applications are grouped into its "cut-and-sew" operations. These operations cover the areas of order entry, fabric purchases and inventory, production control, picking lists, invoicing and daily reports. Each operation is keyed to a specific form or report.

Sales orders are generally placed from product listings organized by style, color variation and division on larger than legal-size sheets. Immediately after input to the system, an acknowledgement of each order is automatically printed.

One copy of the acknowledgement goes to the appropriate salesman, and another is held for use in the shipment process.

21-Key File Number

Because the product in the industry rarely precedes the order, sales are organized through a 21-key file number, which includes a customer number, a customer priority code, a seasonal designation, an order entry date, a start-production date and a date after which the customer will not accept delivery.

Orders for apparel are listed on the sales order sheet. Each of these listings has a corresponding "fabric master" and "style master" already generated by the system.

These masters are generated by informational parameters keyed into the system whenever a particular garment receives design approval. Parameters of the masters include color, fabric and yards usage per garment.

Daisy management then makes an estimate of how many of each garment will be made and sold. The system takes the estimates and multiplies them times the fabric within the masters, which are all cross-referenced according to any common fabrics.

The result is the total amount of each fabric required to meet production estimates. This total can lead to quantity purchasing discounts and can avoid costly duplicate orders of fabric.

Cutting Ticket

The cutting ticket is the next form to interact with the Daisy system. It's essentially a two-part form amounting to a request and authorization to cut a certain amount of fabric in a given style according to the parameters of the style and fabric masters.

Once input to the system, an approved ticket automatically reduces and releases fabric inventory by the number of yards per garment cut and then follows the fabric through the cutting and sewing floors.

Production is reported daily by the system and is stored for periodic cumulative totals. Reporting is by garment, style and cut number.

A more comprehensive daily tally report is also generated.

For Daisy, actual inventory is the number of finished garments available for sale, which is the difference between what's been finished and/or allocated and what's been shipped.

Automatically printed packing lists and labels expedite shipping. Organized by line item, one part of the picking list form set goes with the order itself and includes a statement of freight and insurance charges and the name of the carrier. Picking-list information is then passed by the system directly and automatically to the appropriate invoice.

Allocation Feature

Cutting across all these forms, reports and totals is Daisy's allocation feature.

Prior to the installation of allocation on the system, someone had to manually review all the orders on file whenever it looked like a customer order could be filled and shipped.

Essentially, allocation matches up the order files with the finished-goods inventory. During that matchup, any one of the parameters located within the 21-key order number (or any range within these parameters) may be used to allocate or reserve for a customer the goods he has on order.

The parameters most often used by Daisy are division and season. Thus, every garment in inventory can be reserved or allocated to the appropriate customer according to Daisy division and to the season in which it's intended to be sold.

Once allocated, finished goods can be selected by other parameters within the order number as picking tickets are created. Daisy might call for shipment of all allocated orders, for example, that can be shipped out at least 30% complete by the end of any given month.

The allocation/picking ticket creation feature can be used to control cash flow. If it becomes desirable to increase shipments for a given period, thereby enabling Daisy to present more invoices for payment to its receivables faster, Daisy can use the feature to send out every order that can be filled, all the way down to 1% if that extreme is desired.

The allocation feature can also be used to save money. Smaller packages mean proportionately higher freight charges. Daisy can use the picking ticket creation feature to ensure that no orders are shipped that aren't at least 20% complete, for instance.

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COMPUTER INDUSTRY

CI Notes

Centronics Plans Purchase Of Data Printer for Stock

HUDSON, N.H. – Centronics Data Computer Corp. here has agreed in principle to acquire Data Printer Corp. for 400,000 shares of Centronics common stock.

The acquisition, subject to approval by both boards and Data Printer shareholders, "would be a major step toward making Centronics the one-stop supplier" of printers, Centronics President Robert H. Howard said.

Data Printer's line of 300- to 1,200 line/min printers would complement and expand Centronics' line of 25- to 300 line/min units.

Under terms of the agreement, Data Printer would become a wholly owned subsidiary.

Centronics required that the transaction be accounted for as a pooling of interest. The purchase of stock would result in an 8% increase in the number of Centronics shares outstanding.

Perkin-Elmer, Wangco Talk

NORWALK, Conn. – Perkin-Elmer and Wangco, Inc. have begun discussions and investigations with a view to achieving a merger of the two firms on the basis of exchanging each share of Wangco's approximately 1.1 million shares of common stock for three-quarters of a share of Perkin-Elmer stock.

CDC Inks Iran Agreement

MINNEAPOLIS – Control Data Corp. has signed an agreement with Iran Electronics Industries, an Iranian government-owned firm, to establish a jointly owned company to design, develop and manufacture computer terminal products.

The company, to be called Computer Terminals of Iran, will be owned 70% by Iran Electronics Industries and 30% by CDC.

Initial focus will be on the development of advanced, low-cost computer terminals for high-volume manufacturing, with the first product scheduled for 1978, CDC said.

Development will be completed in CDC facilities here and transferred to Iran for manufacture.

SBC Forms Retail Unit

NEW YORK – The Service Bureau Co. (SBC) has formed a new organization, SBC Retail Services, to provide computerized data management services to the retail community.

The new unit, which incorporates programs and capabilities of recently acquired CRI Data Services, Inc., will have its initial marketing emphasis on the East Coast. Michael Wolff and Sheldon Forman, former principals of CRI, will head SBC Retail Services.

Supershorts

Bell & Howell Co., General Electric Co. and Gordon Lysle, Inc. have agreed to form Microx Corp. to develop and manufacture an instant-image microfilm system. The system would be marketed by Bell & Howell.

– – –

Xerox Corp. has agreed to acquire Versatec, Inc., maker of electrostatic printers and plotters, for an exchange of stock, with each Versatec share valued at $12.50.

– – –

Hycom, Inc. has chosen Sorbus, Inc. to provide maintenance services throughout the U.S. for its 4,800 bit/sec modems.

With the Series 60 Level 6

HIS Renews Commitment to Mini Mart

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – With the introduction of the Series 60 Level 6 minicomputer system here recently [CW, Jan. 26], Honeywell Information Systems (HIS) recommitted itself to a marketplace in which its prestige – and order levels – have been slipping in recent years.

At the same time, the firm expects the Level 6 system will be a "real sleeper" in the marketplace, boosting overall sales and revenues in the coming years.

Honeywell had been perhaps the first complete-line mainframe supplier in the minicomputer area through its acquisition May 26, 1966, of Computer Control Co., which became the Computer Control Division of the firm.

At the same time, however, its sales in the mini area have been slipping of late. In 1973 the firm was estimated to have had minicomputer revenues of $93 million, accoridng to Interntaional Data Corp. (IDC), a market research firm.

And although the firm claimed at the Level 6 introduction to have had sales of $90 million in the area last year, the IDC estimates show only $50 million worth of business.

Both may be right for the year, because Honeywell counts all minicomputers sold – whether internal or external – in its figure while IDC counts only external sales.

Honeywell declined to break down the figure between internal and external sales and admitted its figures for last year include front-end processors sold with systems as well as items such as the minicomputer controllers in its page-printing system.

Analysis

Sales Method Changed

The Level 6 clearly is designed to overcome the problem of declining sales – and the marketing effort planned calls for a shift in the way the firm has previously handled minis.

In the first place, the firm has established a dedicated minicomputer sales force to handle marketing of the systems to OEMs and systems houses as well as to sophisticated end users who are putting together complete systems as internal systems houses.

The mainframe marketing force will handle sales of the system for applications such as distributed data processing where the mini system is used as part of the overall DP installation.

In addition, Honeywell is also planning to encourage systems and software houses to build particular industry applications around the Level 6 systems and will even market the systems if they have wide enough application.

This latter move, not mentioned publicly at the press announcement for the news units, will help Honeywell by allowing it to avoid the costs of developing specific industry-oriented applications packages in cases where outside suppliers who might have a feel for that particular market can be brought into the picture.

At the same time, however, the firm indicated it would develop some specific industry applications in-house that would be announced later this year. These are expected to be fairly general, however.

Report Predicts System/32 Sales Of $2.6 Billion Over Six Years

By Toni Wiseman
Of the CW Staff

NEW YORK – System/32 sales over the 1975-1981 time period are estimated at 63,000 units worth over $2.6 billion, with sales divided between small business computer systems and remote computing, according to a report by Frost & Sullivan, Inc., a market research firm here.

The study predicted shipments in 1975 would total $120 million, with 3,000 units sold as small business computers and 1,000 for remote computing.

By 1978, remote computing will account for shipments of 4,000 units valued at $160 million, while 5,000 small business computers, valued at $200 million, will be shipped.

In 1980 and 1981 shipments in the two areas will be equal, with 6,000 units shipped in each category in 1980 and 7,000 in each category in 1981. Sales values for the units will be $240 million in 1980 and $280 million in 1981.

Built-In Sales Base

"While IBM must face stiff competition, it has a built-in sales base of potential System/3 users that can now be sold, as well as IBM 1130 users and those small companies that desire to use IBM products," the report stated.

"These users, when added to 80% of sales within the normal user base who will select this type of system, add up to 35,000 units by the end of 1981."

Frost & Sullivan estimated industry application packages supplied by IBM will be used by about 32% of System/32 small business computer users, while 40% will turn to packages from independent systems houses and 28% will do their own programming.

"Most of these users [doing their own programming] are existing or potential System/3 models 6 and 8 users who have decided to downgrade to a lower cost system but will continue to program," the report said.

Application Package

Shipments of industry application packages will jump from 500 in 1975 with a value of $7.5 million to 2,500 in 1981 with a value of $37.5 million.

In all, some 11,200 packages are expected to be shipped in the 1975-1981 time period, worth a total of $167.5 million.

Because of the existing market base, but also "IBM's industry domination, especially in manufacturing where decentralized data processing will be strong," the report predicted that the use of System/32s in dispersed DP as remote computer terminals will exceed their use in small business systems areas.

The study noted the advent of the System/32 should open up markets for competitors as well, particularly those small business computers in the $20,000 to $40,000 range.

Within the larger size user group, the System/32 will strengthen in the remote computing concept and will likewise strengthen the existing data entry manufacturer marketing base, Frost & Sullivan predicted.

"Therefore, the existence of the System/32 is probably as good for most of its competitors as it is for itself," the report said.

"Probably the worst hit by IBM's entrance is Burroughs Corp., which could have eventually captured a larger size of the market.

However, it is probably IBM that has forced Burroughs to become more competitive in the small business computer area," the report concluded.

Study Depicts IBM Resale Values

By Toni Wiseman
Of the CW Staff

MENLO PARK, Calif. – The resale value of a used IBM CPU drops to 80% of the original price immediately after purchase because of sizable investment tax credits and associated tax benefits which are available for new equipment, according to a report issued by Stanford Research Institute (SRI).

The resale value of used CPUs of a particular family remains relatively constant at this 80% level for about four years after a family is introduced, regardless of when the unit was purchased or manufactured, the report said.

A research team of industrial economists under David C. Penning, director of communications at SRI, found there are two reasons for the high price plateau.

First, there are few used computers for sale in the first years after a new computer line is introduced, since equipment is either bought and retained for several years or is leased.

Secondly, computer systems do not wear out, but are obsoleted by new technology. This means that, with proper maintenance, used equipment is just as functional as new.

Value Drops Abruptly

Four years after its introduction, however, the value of a computer system begins to drop abruptly because of many potential buyers decide to postpone purchases until a new family is available. This results in declining demand for computer systems during this period, Penning said.

Historically, IBM has introduced a new line of computers every five or six years, Penning noted.

The decline in resale value precipitated by the introduction of a new IBM family continues for some three years, leveling off at 20% of purchase price.

This new plateau is the result of the constant ratio between price and performance – older equipment lacks the functional capability of a new line reflecting a corresponding decline in in price.

"In the 11th year after market introduction, purchasers begin to anticipate the availability of still another new family, causing a further dip in value of the older generation computers," the report stated.

"By year 13, technological innovations in the newer systems have rendered most of the old computers uneconomic to use. Thus their price falls to only slightly more than their scrap value," it said.

Peripherals Curve Similar

A curve plotting the value of computer peripherals over their useful life has a similar shape, but the 80% resale value plateau lasts only two years and then drops sharply, the SRI group found.

The shorter plateau is explained by the

(Continued on Page 28)

Cadapso Asks Government to Stop Bank DP Services

By Toni Wiseman
Of the CW Staff

OTTAWA – The Canadian Association of Data Processing Service Organizations (Cadapso) has asked the government here to prohibit chartered banks from furnishing DP services, except in the fields of automated payments and wholesale banking.

Chartered banks currently offer a variety of service bureau-type functions including payroll, general ledger, accounts payable and receivable and municipal taxation services.

To permit banks to continue these activities and set up their own computer service companies would "cause irreparable harm to the industry . . . and possible lead to complete domination by foreign suppliers," Cadapso said in its plea to the Department of Finance on the 1977 revision of the Bank Act.

Restrictions on banking activity in the computer services industry are necessary to protect the industry against "predatory pricing" by the banks and "increased service charges to all bank customers for traditional bank services."

Cadapso further requested that banks be permitted to offer only computer services furnished by independent service companies "on an arms-length basis," and these services companies would then have access to the 6,000 branch banks as delivery and service centers.

Banks, if the brief is accepted, would also be restricted to a maximum of 10% of the equity of such companies, which would be limited to using their own computers on premises different from the banks'.

Banks now holding more than 10% equity in a computer service company would be given two years to sell their excess ownership, Cadapso added.

Banks have started to offer nonbanking DP services "largely because banks wish to compete more effectively among themselves for customers and not because these services are part of the essential function of banking," Cadapso proposed.

Cadapso questioned the quality of computer services offered by banks, saying they had squeezed out independent companies by offering "services based on software which had not even been fully developed."

Finally, the brief suggested that banks face a conflict of interest in competing with independent service companies which are dependent on banks for loans.

Service Squeeze Seen in Canada

By a CW Staff Writer

TORONTO – The ability of computer service companies to handle DP more economically than can be done with in-house computers will be an important factor in their growth this year, according to Richard G. Taylor, president of the Canadian Association of Data Processing Service Organizations (Cadapso).

Taylor, addressing a meeting of the Canadian Information Processing Society (Cips), predicted an industry growth rate of 15% to 35%, but cautioned that tight capital markets could cause some smaller companies to merge in 1976.

"Competition will continue very strong," he said. "The price constraints of the present economic environment, when added to this atmosphere of very strong competition, will produce a profitability squeeze.

"There could be some mergers in the industry, especially among companies affected most directly by the increasing use of minicomputers. All companies will have to shift their emphasis in accordance with the changes of technology," he said.

Taylor predicted data processors will rely more on network-based systems which combine on-line activities with batch processing in the coming years. This in turn will require more remote processing, whether using in-house computers or service companies.

"One pitfall to beware of is the loss of control of DP expenditures that can arise in having a multiplicity of locally controlled minicomputers," Taylor said.

"The selection of DP strategies will strongly influence the ability of an organization to complete in its field of business. Remote or shared processing is now the fastest growing element in DP expenditures," he said.

Computer hardware sales and rentals reached $376.5 million in 1973, but this represented an annual growth of only 1.8%, he said. Services revenue, however, reached $213 million, a growth rate of 28.9%.

Taylor said Cadapso will keep a close watch on revision to the Bank Act and "will resist most strongly the use of our industry as a loss leader in the battle for banking supremacy."

In conclusion, Taylor called for an increase in the present 20% annual capital cost allowance on computer equipment, saying that more generous depreciation rates in the U.S. make it more difficult for Canadian companies to compete.

Data on Hospital Services From Four Vendors Offered

CHICAGO – Hospitals in the process of selecting a computer services system suited to their individual needs may now turn to a reference manual which provides comparative data on four vendors.

Cost of the publication is $15 from the Chicago Hospital Council at 840 North Lake Shore Drive, Chicago, Ill. 60611.

IBM Resale Value Trends Depicted in Study by SRI

(Continued from Page 27)

nature of competition from non-IBM peripheral suppliers.

"Normally it takes these suppliers about 18 months from the time IBM introduces a new line of peripherals to develop and introduce interchangeable, often less expensive equipment," the report said.

"Naturally, when such equipment becomes available, the value of the IBM peripherals drops rapidly, reaching a new plateau at about 20% of the selling price for new equipment by the fifth year," the report concluded. SRI is at 333 Ravenswood Ave., Menlo Park, Calif. 94025.

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French Strong in Software

LONDON – "French software companies have been the leading proponents of international collaboration – but, unlike their hardware contemporaries, they have adopted this stance from a position of strength, according to *EDP/Europa Report* (EDP/ER) published here.

"And while not all such ventures could be counted as total successes, this has allowed France to grow into the largest software market outside the U.S. – with the largest domestic companies serving this sector," the report continued.

The CAP-Sogeti-Gemini group remains the largest French-dominated European software house, with an annual turnover of $45.4 million. Other leading firms include CISI, GSI and Sligos.

Software represents 1.88% of the gross national product for France, as compared with 2.86% for the U.S. It represents, however, only 1.42% for the UK and 1.4% for Japan, EDP/ER said.

The success of the French software industry provides the European alternative to total American domination of the computer market, according to M. Serge Kampf, president/director general of CAP-Sogeti.

Sanders Pretrial Moves to N.H.

NASHUA, N.H. – The pretrial portion of Sanders Associates, Inc.'s antitrust case against IBM has been remanded to the Federal Court District of New Hampshire located in Concord.

Observers indicated this should allow a more independent course of discovery.

The Sanders case is slated to be tried in New Hampshire, but its pretrial phase was being conducted in conjunction with that of several California firms suing IBM.

The ruling was handed down by the judicial panel on multidistrict litigation.

Despite Dip in Revenues

Sperry Meets Quarter Net Objectives

NEW YORK – Sperry Rand Corp. "continued to meet overall income objectives in the third quarter," according to Chairman J. Paul Lyet.

Earnings rose 7.1% to nearly $35 million or 98 cents a share compared with $32.7 million or 92 cents a share in the same period last year, when there was a $5.4 million special credit from the sale of land.

Excluding the 1974 credit, Sperry's income rose 28.5%.

Slight Decline

The gain in income was achieved despite a slight decline in revenues, which were off nearly 1% to $778.7 million compared with $786 million in the year-ago period.

For the nine months, the firm's earnings rose nearly 18% to $104.1 million or $2.92 a share compared with $88.5 million or $2.50 a share for the same period last year. Excluding the special credit, income rose 25%.

Revenues for the nine months rose 4.1% to $2.3 million compared with $2.2 million last year.

The earnings figures for prior periods were restated to reflect a change in accounting for foreign adjustments and for engineering costs related to computer systems.

Both items are now charged to income in the period incurred, and previously deferred foreign exchange adjustments have been written off.

Orders Rose

New computer orders rose slightly over a strong year-ago third quarter and showed all 11% gain for calendar 1975, the firm said.

Revenue from computers and farm equipment in particular rose in the third quarter, but these gains were more than offset by expected revenue reductions in fluid power products and office equipment, the firm said.

Backlog for the total corporation was $2 billion, the same level as a year ago.

Dollar Value Down

During the quarter, the weakening of foreign currencies resulted in a "significantly lower U.S. dollar value of revenue from foreign operations," which adversely affected revenues by about $25 million, the firm said.

Office product equipment revenue was down 18% Lyet said. "Our continuing program to restructure the business and make more productive use of assets is beginning to have an impact," he said.

Cost-control and asset-management programs have been effective and are continuing to have a favorable effect on income results, he said.

DG Charges DCC In Second Suit

WILMINGTON, Del. – Data General Corp. (DG) has filed a second suit against Digital Computer Controls, Inc. (DCC) charging DCC's models 216, 316, 516 and Mod 5 are entirely derived from the DCC 116 and could not have been designed without the 116.

The court has already ruled DCC's use of DG's maintenance logic drawings for the Nova 1200 in the design of DCC's D116 was improper.

The order, which is stayed pending appeal, enjoined DCC "from the use of Nova 1200 and D116 logic drawings for the purpose of manufacturing computers substantially identical to the Nova 1200."

The latest filing by DG essentially broadened the complaint to include DCC's latest models.

The suit, filed in Chancery Court here, comes while the two firms are awaiting the court's decision on DCC's appeal of the trade-secret case filed against it by DG.

DCC President John Ackley called the new suit a "harassment, more of the same," avowing that his firm will eventually win.

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EMM Expands Commitment to Users, Semiconductors

By Molly Upton
Of the CW Staff

EL SEGUNDO, Calif. – With its introduction of an add-on memory for the IBM 370/158 (see story on Page 19), Electronic Memories & Magnetics Corp. (EMM) has expanded its commitment to the end-user marketplace and to semiconductor technology, according to Dick Bravo, general manager of systems equipment operations in EMM's Computer Products Division.

The 158 memory incorporates static 4K NMOS chips which EMM manufactures in-house.

The firm also supplies 1K chips for its 370/145 unit and has a cross-licensing agreement with General Instrument Corp. which will permit it to manufacture General Instrument's 16-bit microprocessor, Bravo said.

The firm expects to use most of these micros in its own products, he added.

EMM is the only independent to provide static memory chips, Bravo said. These do not require refreshing because they have no capacitors, which enables the EMM 158 memory to be much simpler in design and interface than the 145 unit, he said.

EMM's model for the 145 has been "reasonably successful," he observed, but admitted the 145 marketplace "has some characteristics that worry us."

The firm expects to install more models in 1976 than last year, but it is "highly unlikely" it will produce them in 1977, Bravo said.

Leonard Kilfoyle, EMM's director of sales, thinks the 158 probably has the longest life span of any model in the 370 family, in a manner similar to the life of the 360/65.

In Bravo's view IBM made a mistake when it thought it priced the 158 memory sufficiently low to discourage entry by independents. "It was wrong," he said.

EMM looked at the memory market for the IBM System/3 but decided prices had eroded to the point where it was not feasible.

Now EMM is investigating other System/3 products in conjunction with memory. Originally the firm was thinking of core memory for the System/3 but now, with its 4K capability, such a memory could be used on models like the 10, Bravo observed.

EMM is also looking at the 135 marketplace for add-ons, he said.

The firm's commitment to the memory marketplace can be seen through its relatively long history in the field, its efforts to become vertically integrated, its use of its own direct sales force and the fact it carries its own lease paper, Bravo said. EMM uses Sorbus, Inc. for maintenance.

Core Production Down

Core production is down from about 12 billion units in 1974 to about 4 billion to 5 billion in 1975, Bravo said.

The firm anticipates 1976 will be the first year that revenues from semi products will approach those from core, he said. They should exceed core revenues by 1977..

The Semiconductor Division is a "primary investment of EMM," he said, and although it is not yet profitable by itself, it contributes significant value to the other divisions that use its production.

The division went through a phase of producing bipolar devices and now is devoted exclusively to NMOS, he added.

The Computer Products Division, which markets the add-on memories, has its primary manufacturing facilities in Hong Kong and Taiwan and represents about $35 million or more in capital investment.

"Semis are our real baby now," Bravo said, indicating significant capital was poured into the effort during 1975.

In addition to putting increasing emphasis on semi technology in 1975, the firm also saw customers delay orders because of the economy. A loss of orders was experienced from customers who either vertically integrated their own core capabilities or converted to semi memory, he said.

"We are continuing our investment in the end-user business and expect the lease base to grow about 25% and to add 25% or more in terms of revenue, he said.

The 1976 capital investment will not be as great as in 1975, so that should help profitability, he added.

Leasing Emphasized

EMM prefers to lease its equipment and tries to make its lease arrangements "super attractive. We may or may not be competitive on the sale price," Bravo said.

"It's our belief that, if you're an end-user company, you really have to be a lease company," he added.

In some respects Bravo looks upon sales as a liability, he said, since they generate cash in only one fiscal period and incur maintenance over a long period of time.

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Singer Offspring Abroad Called Bitter

PARIS – It isn't hard to understand the bitterness of certain overseas Singer subsidiaries over Singer Co.'s decision to withdraw from the computer business – particularly because a number of them contributed to profits or, at least, did not show losses recently, according to *Zero-Un Informatique*.

This is the case for Singer Computer AG, which had a turnover of $7.22 million in 1975.

"We are an attractive fiancee," Rolf Muller, regional director, said. "We have installed, in Switzerland, around 100 System Tens and more than 100 of the 1500 systems.

"As for point-of-sale terminals, we have more than 2,000," he said.

Following the guidelines put out by its parent company, Singer Computer AG announced it would accept orders until June with deliveries stretching to June 1977.

Maintenance, it said, would be guaranteed for five years after equipment delivery.

In the UK, there are some 500 Singer System Ten computers installed or on order; about 700 of the point-of-sale units and 350 of the 1500 series intelligent terminals have been installed.

In addition, there are some 600 factory data collection units installed.

The UK sector realized a profit of $2 million on a turnover of $20 million in 1975, according to *EDP/Europa Report*.

EDP/ER suggested the solution might well be the purchase of Singer Business Machines (SBM) by a European company or companies or the injection of European finances.

This would seem logical since the main base of Singer installations is in Europe and the international operation of SBM has been profitable, the publication said.

Singer Division, Ready for Selling, Wins Big Brazilian, French Orders

By Ivan Berenyi
Special to Computerworld

Within weeks of deciding to sell its Business Machines Division, Singer Co. has won a spate of computer orders.

One of them, a $3.5 million deal from Brazil's National Institute for Social Welfare, is ironically one of the biggest single orders the division has had in recent times.

Singer's finances forced it to request a $1.5 million deposit from the Brazilian government in order to finance the order. It must have been some consolation to the embarrassed management that the deposit was agreed upon within four days, observers said.

In France, at the same time, orders worth $2 million were received for 34 Singer 1500 intelligent terminals, 10 System Ten computers, 80 MDTS point-of-sale units and a batch of 4300 key-to-tape units.

The orders were seen as a shot in the arm for the division's chances of being sold as a going concern, as well as a morale booster for its staff.

One cluster will be installed in each of the 10 existing data entry centers spanning the country and operated by Dataprev, the Institute Nacional de Prevision Social's (INPS) in-house bureau. Two more centers will be added to the network to serve INPS' Burroughs B7700-equipped computer center in Rio de Janeiro off-line.

INPS collects health insurance and social security contributions and distributes sickness benfits and welfare payments.

The Brazilian order was for 12 24K Model 1503s, each equipped with a 5M-byte Diablo disk, and 240 8K Model 1501s to be hung on the 1503s.

Fairchild, Cambridge Reach Settlement

BEDFORD, Mass. – Cambridge Memories, Inc. and Fairchild Camera & Instrument Corp. have settled claims against each other stemming from disputed payment by Cambridge for supplies from Fairchild.

Fairchild had filed suit against Cambridge charging it with nonpayment for shipments of 1K bipolar random-access memories (RAM) and also for goods ordered but not delivered.

Cambridge countered, charging violation of antitrust and breach of contract.

The out-of-court settlement involves payment by Cambridge of an unspecified amount over a period of 10 months, a Cambridge spokesman said.

Contracts

Control Data Corp. has been awarded a $19.7 million contract from the U.S. Naval Sea Systems Command for 70 extended core memory units.

Collins Radio Group of Rockwell International Corp. has received a $10 million contract from the Royal Netherlands Air Force for an integrated switched digital-voice network to provide communications among all Air Force facilities in the country.

International Communications Corp. has received a contract from the British Royal Navy to supply high-speed modems for use in the Navy's data communications network.

Bunker Ramo Corp. has received a $1.5 million contract from the Hertz Corp. to produce programmable agent terminals for Hertz car rental offices.

American Management Systems, Inc. has been awarded a contract from the City of New York to conduct management and technical studies for computer-based accounting and financial systems for the city.

Hazeltine Corp. has received a $761,000 contract from the City of Dallas, Texas, for an automatic vehicle monitoring system to be used by the Dallas Police Department.

Computer Corp. of America has received a contract from the U.S. House of Representatives' Committee on House Administration for a Model 204 data base management system.

Stromberg Datagraphix, Inc. has been awarded a contract valued at more than $1 million from the U.S. Marine Corp. for eight System 4500 computer output microfilm systems.

Syntonic Technology, Inc. has received a five-year contract from the Ohio Turnpike Commission for maintenance of the recently installed toll audit system.

Bunker Ramo Corp. has received a contract from King Kullen, Inc. to equip nine supermarkets with Esis electronic cash register systems.

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Nonimpact Printer Mart Seen Growing 30%

NEW CANAAN, Conn. – The market for nonimpact printers has increased almost tenfold in the past five years and will continue to grow at a rate of 30% to 40% per year in shipments over the next several years, according to a report by International Resource Development, Inc. (IRD).

The greatest growth is expected in the ultra-high-speed nonimpact printer market, as a result of IBM's blessing of the concept and Xerox Corp.'s continued effort in this area. Honeywell and several Japanese firms are also known to have high-speed nonimpact technology available, the report said.

The report estimated that by the end of 1975, the installed base for nonimpact teleprinters and interactive terminals, including Telex and TWX, would be 78,500; for high- and medium-speed printers and plotters it would be 9,190; and 17,000 for word processing, CRT printout and other applications.

Shipments for 1975 would amount to $120 million, representing 41,500 units. IRD predicted shipments would grow to a value of $192 million or 56,800 units in 1977, $314 million or 87,700 units in 1980 and more than $400 million or 110,000 units in 1985.

These figures must be used cautiously, however, an IRD spokesman said, because they include not only $15,000 nonimpact printers, but also IBM's $310,000 3800 laser printer and Honeywell's high-speed electrostatic printer.

A survey of 100 "Fortune 1,000" companies conducted in conjunction with the study revealed that those users who already have nonimpact printers are generally satisfied with them and plan to acquire more in the future.

The major concern among nonusers, the report noted, was the inability of most nonimpact printers to print multiple copies of output. Users, however, said multiple copies can be produced easily by rerunning the print operations as many times as desired.

Further information on the report is available from IRD at 46 Main St., New Canaan, Conn. 06840.

NYSE Buying Odd-Lot Processing Unit 1

By Kathleen P. Quinn
Of the CW Staff

NEW YORK – The New York Stock Exchange (NYSE) will purchase the computer capabilities of Carlisle DeCoppet & Co. for $3.5 million, according to a memorandum of understanding signed by the firms recently.

Carlisle was formerly the exclusive broker on the NYSE floor dealing in odd-lot orders of less than 100 shares of stock.

Carlisle's decision to sell its odd-lot processing system to NYSE signaled its departure from the business, a NYSE spokesman said.

Carlisle "faced the prospect of losing – in one fell swoop – 26% of its business" after Merrill Lynch Pierce Fenner & Smith, Inc., its largest customer, it would begin to market odd-lot securities at competitive prices away from the exchange floor, the NYSE spokesman said.

Merrill Lynch's tradition-breaking plan was the result of the Securities Exchange Amendments of 1975, which have "set up a highly competitive scenario," the spokesman said.

The system NYSE is purchasing is a package based on five Digital Equipment Corp. PDP-11s. It was custom-built by Data Trends, which has since gone out of business.

The system will now be operated by the Securities Industry Automation Corp. (Siac), a subsidiary of NYSE and the American Stock Exchange. The subsidiary hopes to absorb as many Carlisle employees as possible, the NYSE spokesman said.

A contract finalizing the agreement has not yet been signed.

Executive Corner

■ George Barratt has been named vice-president of finance and chief financial officer of Computer Sciences Corp.

■ Robert N. Johnsen has been elected corporate vice-president of Applied Magnetics Corp.

■ Arthur R. Field has been elected vice-president of sales of Graham Magnetics, Inc.

■ Frank R. Lautenberg, president and chief operating officer of Automatic Data Processing, Inc., also has been named chief executive officer of the company.

■ Robert W. Grenier has been named vice-president of marketing for Computer Sciences Corp.'s Commercial Division.

■ Kenji Matsuda, Thomas P. Quinn and Robert I. Weyhe have been named vice-president of engineering, marketing and manufacturing respectively at Data Disc, Inc.

■ Kirk Jeffrey and Dr. Gerhard H. Dirks have been elected to the board of directors of Carter Associates.

■ Keith Gathergood and David Tayler have been appointed to Computer Analysts and Programmers Ltd.'s Management Meeting, the company's top policy body.

■ Donald B. Gridley has resigned as president and director of Aspen Systems Corp.

■ Stuart J. Lock has been elected to the board of directors of Vermont Research Corp., replacing John G. Kristensen on the five-member board.

■ Paul J. Malloy has been named vice-president of manufacturing at Quantor Corp.

■ Dr. James A. Cunningham has been appointed senior vice-president of Advanced Memory Systems, Inc.

■ John J. Kramer has been named vice-president of marketing for Computer Sciences Corp.'s Infonet Division.

■ James H. Chambers has been appointed president of Computeristics, Inc., succeeding Alton D. Fordham, who has retired.

Earnings Reports

ADDRESSOGRAPH-MULTIGRAPH
Three Months Ended Oct. 31

	1975	1974
Shr Ernd	$.10	$.07
Revenue	133,828,000	140,023,000
Earnings	a829,000	594,000

a-Reflects pretax gain of $586,000 from repurchase of debentures.

ANACOMP
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.22	$.16
Revenue	2,983,064	1,650,559
Tax Cred	59,970	57,000
Earnings	210,219	125,306

CAMBRIDGE MEMORIES
Year Ended Aug. 31

	1975	1974
Shr Ernd	.....	$.70
Revenue	$18,858,000	23,140,000
Earnings	(4,128,000)	1,040,000

COMPUTERVISION
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	.....	$.19
Revenue	$5,471,000	7,027,000
Earnings	(3,831,000)	440,000
9 Mo Shr	.....	.66
Revenue	15,747,000	19,352,000
Earnings	(4,156,000)	1,520,000

DATAPOINT
Three Months Ended Oct. 31

	1975	1974
Shr Ernd	$.56	$.45
Revenue	14,452,000	10,074,000
Tax Cred	495,000	249,000
Earnings	1,503,000	898,000

TEKTRONIX
Three Months Ended Nov. 15

	1975	a1974
Shr Ernd	$.70	$.61
Revenue	82,210,000	77,153,000
Earnings	6,160,000	5,182,000
6 Mo Shr	1.36	1.21
Revenue	157,068,000	149,993,000
Earnngs	11,920,000	10,492,000

a-Restated for change to Lifo accounting.

WYLE LABORATORIES
Three Months Ended Oct. 31

	1975	1974
Shr Ernd	$.16	$.23
Revenue	30,727,000	33,038,000
Earnings	507,000	815,000
9 Mo Shr	.38	.69
Revenue	89,195,000	100,833,000
Earnings	1,257,000	2,462,000

DIGI-LOG SYSTEMS
Year Ended Sept. 30

	a1975	1974
Revenue	$1,906,000	$2,143,000
Loss	b440,000	150,200

a-Preliminary. b-Reflects $299,000 charge from write-off of previously capitalized financing cost and inventory write-down.

FABRI-TEK
Three Months Ended Oct. 3

	1975	1974
Shr Ernd	.....	$.03
Revenue	$7,016,000	8,454,000
Earnings	(376,000)	126,000
6 Mo Shr	.....	.12
Revenue	14,637,000	18,990,000
Earnings	(679,000)	438,000

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State of Louisiana, Office of the Governor, has a top administrative position open in its statewide D/P authority and is seeking a highly experienced, diversified administrator with large-scale systems management experience. Forward resume and salary requirements to: Asst. to the Commissioner, Louisiana Information Processing Authority, State Capitol Building, P.O. Box 44095, Capitol Station, Baton Rouge, LA. 70804.

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Applications (with full professional resume and the names of three professional references) or nominations should be submitted prior to March 1, 1976 to: Donald Parker, Chairman of Search Committee, Office of Finance and Administration, Portland State University, P.O. Box 751, Portland, Oregon 97207. Phone: (503) 229-3712.

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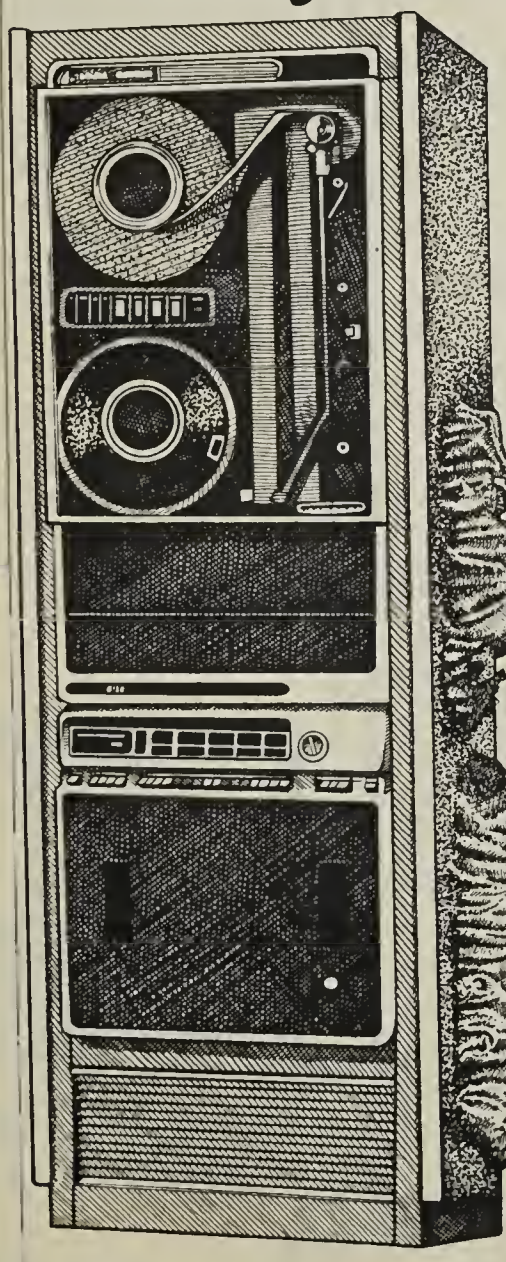

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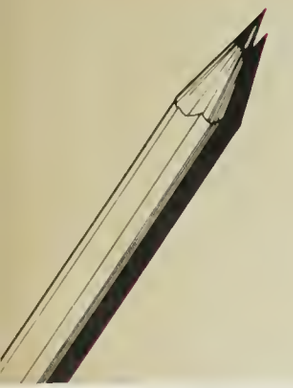

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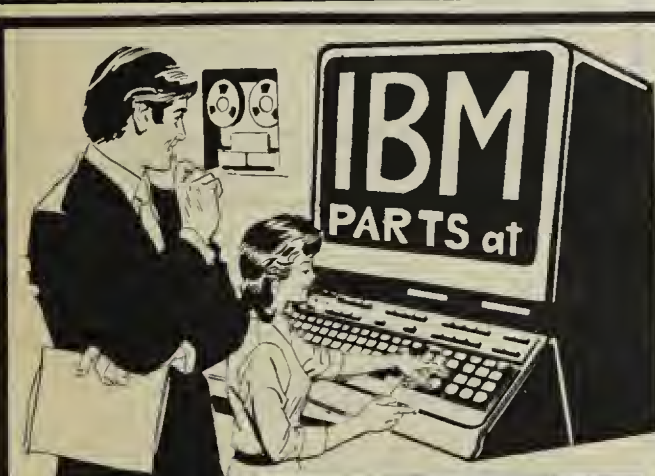

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The Board of Hospital Trustees reserves the right to reject any or all bids, to accept or reject any one or more items of the bid, and to waive any irregularities or informalities in the bids or in the bidding.

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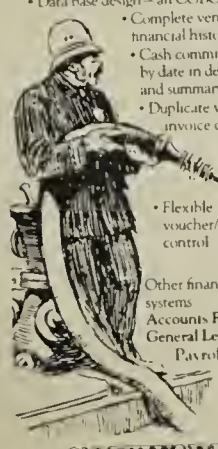

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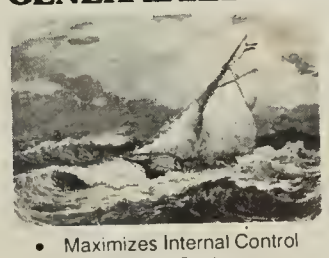

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Centronics Reports Records

HUDSON, N.H. – Centronics Data Computer Corp. reported record earnings and revenues for the quarter and six months ended Dec. 31.

Earnings climbed to $2.6 million or 55 cents a share for the second quarter compared with $1.8 million or 38 cents a share in the same period last year.

Revenues reached $13.2 million compared with $10 million in the year-ago quarter.

For the six months, sales amounted to $24.4 million, capping the year-ago period figure of $20.2 million.

Half-year earnings totaled $4.7 million or $1 a share compared with $3.6 million or 76 cents a share.

Quarter Earnings Also Rise

DEC Half-Year Net Jumps $10 Million

MAYNARD, Mass. – Digital Equipment Corp. scored record earnings and revenues for the second quarter and first six months ended Dec. 27.

During the quarter, DEC's earnings rose to $16.3 million or $1.35 a share compared with $9.8 million or 81 cents a share in the year-ago period.

Revenues for the three months totaled $172.6 million compared with $126.8 million in the same period last year, a rise of 36%.

Service and other revenues rose 53% to $36 million compared with $23.5 million in the year-ago quarter.

For the six months, DEC's earnings jumped to $27.7 million or $2.30 a share compared with nearly $17.3 million or $1.44 a share in the same period last year.

Revenues reached $313.1 million compared with $238.6 million in the last year's half. Service and other revenues rose 55% to $65.8 million compared with $42.5 million.

DEC attributed much of the strong performance to a steadily improving worldwide order pattern, continued economic recovery and a series of product introductions which began last February.

Business continued strong in the OEM and end-user commercial markets, DEC said.

Large system orders and shipments met expectation for the quarter as customers in most market segments maintained their interest in purchasing Decsystem-10s for large-scale time-sharing projects, the company said.

Decsystem-1080 production is on schedule, with an increasing number of units to be delivered this quarter, it added.

The company said it continues to be encouraged by overseas sales, particularly in major European countries.

DEC's outlook for the remaining six months of this fiscal year is optimistic. "Although responsive in part to the speed in recovery of the national economy, the company's order and shipment pattern points to a continuation of profitable growth," the firm said.

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Incoterm Quarter Sales Rise 41%; Revenues Up 71% in Nine Months

NATICK, Mass. – Third-quarter revenues at Incoterm Corp. were 41% higher and nine-month revenues were 71% higher than those of the comparable year-ago periods.

Revenues in the quarter reached $8.3 million compared with $5.9 million for the same period last year.

Earnings increased to $612,000 or 30 cents a share from $373,000 or 18 cents a share in the year-ago quarter.

Revenues for the nine months rose to $23.9 million from $13.9 million reported for the same period in 1974.

After an extraordinary credit in the first quarter of $193,000 or 10 cents a share, earnings in the nine months rose to $1.9 million or 95 cents a share compared with a loss of $298,000 or 22 cents a share for the same period last year.

During the third quarter, Incoterm decreased bank borrowing by $1 million to the current level of $200,000. Borrowings had totaled $2.2 million at the start of the year, the firm said.

Backlog at the end of the period was $18.8 million, reflecting an increase of 13% over the $16.6 million backlog reported at the same time last year.

"New orders previously announced resulted in management revising its earlier estimate concerning revenues for the fourth quarter of this fiscal year," Incoterm President Jean N. Tariot said.

Results Improve For Year at REI

DALLAS – Recognition Equipment Inc. (REI) reported earnings rose to $3.4 million or 58 cents a share on revenues of nearly $59.3 million for the year ended Oct. 31.

This compared with earnings of $2.1 million or 39 cents a share on revenues of $42.9 million for 1974.

Included in income for 1974 was a gain of nearly $2 million from the restructuring of the company's 7.5% convertible subordinated notes. Without that gain, earnings of $88,000 for 1974 would have resulted, REI said.

The purchase value of equipment shipped during 1975 totaled $30.2 million compared with $30.3 million in 1974. A change in the lease/purchase ratio in 1975 contributed to the jump in earnings.

For the three months ended Oct. 31, revenues rose to $16.7 million from $14.2 million in the same period last year.

Earnings jumped to $1.2 million or 22 cents a share from $724,000 or 13 cents a share in the year-ago quarter.

Microdata Posts Rise In Three Months Net

IRVINE, Calif. – Microdata Corp.'s earnings for the first quarter ended Nov. 30 jumped to $413,817 or 25 cents a share compared with a loss of $147,705 or 9 cents a share in the same period last year.

Revenues rose 42% to $4.9 million compared with $3.4 million in the same period a year ago.

Orders booked during the quarter doubled to a record $8 million compared with $3.9 million in the year-ago period.

New Registrations

PERTEC CORP., 101 Continental Blvd., Suite 435, El Segundo, Calif. 90245, a data entry firm, filed to register 1.9 million shares of common and will issue 1.8 million in exchange for the outstanding shares of common of Computer Machinery Corp. (CMC) at the rate of .3475 share for each CMC share.

Of the rest, 94,657 may be issued upon the exercise of stock options granted to CMC employees and 44,227 are to be reserved for issuance upon conversion of the CMC 7% convertible subordinated notes, due 1977. No underwriter is involved.

MCI COMMUNICATIONS CORP., 1150 17th St. N.W., Washington, D.C. 20036, an intercity business and data communication service, filed to register 1.6 million shares of common and 84,460 shares of Series B cumulative convertible preferred.

MCI will offer to acquire 580,394 outstanding shares of common of N-Triple-C, Inc., not owned by MCI, in exchange for 260,197 shares of MCI common plus shares to cover fractional interests and to make an offer to acquire the presently outstanding 8% convertible subordinated debentures, due 1983 of N-Triple-C in the amount of $8.4 million in exchange for 84,460 shares of Series B preferred. No underwriter is involved.

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Earnings Reports

CUBIC
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.31	$.11
Revenue	19,889,300	18,423,400
Earnings	691,700	243,500
9 Mo Shr	.68	.40
Revenue	63,770,600	57,559,800
Earnings	1,511,200	910,600

VERMONT RESEARCH
Year Ended Sept. 30

	1975	1974
Shr Ernd	$.24	.....
Revenue	5,347,838	3,801,631
Earnings	169,898	(309,596)

CODEX
Year Ended Sept. 30

	1975	1974
Shr Ernd	$3.01	$2.71
Revenue	26,230,000	17,958,000
Tax Cred	.....	950,000
Earnings	4,409,000	3,934,000
3 Mo Shr	.68	.70
Revenue	7,190,000	5,604,000
Earnings	1,054,000	1,012,000

COMPUTER INSTRUMENTS
Nine Months Ended Oct. 10

	1975	1974
Revenue	$3,558,674	$3,794,750
Loss	252,934	59,996

DATA DOCUMENTS
Year Ended Sept. 30

	1975	1974
Shr Ernd	$6.08	$6.81
Revenue	64,749,066	55,979,932
Tax Cred	.....	98,000
Earnings	2,857,886	3,197,095

DECISION DATA COMPUTER
Three Months Ended Aug. 30

	a1975	1974
Shr Ernd	.....	$.11
Revenue	$7,579,000	10,758,000
Tax Cred	.....	196,000
Earnings	(663,000)	413,000
9 Mo Shr	.....	.22
Revenue	30,426,000	27,924,000
Tax Cred	.....	390,000
Earnings	(170,000)	824,000

a-Reflects $192,000 write-off of 15% investment in International Engineering Ltd.

SCIENTIFIC SOFTWARE
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.13	$.14
Revenue	1,296,000	911,000
Spec Cred	83,000	84,000
Earnings	163,000	168,000
9 Mo Shr	.35	.43
Revenue	3,209,000	2,747,000
Spec Cred	207,000	251,000
Earnings	434,000	532,000

STERLING COMPUTER SYSTEMS
Three Months Ended Sept. 30

	1975	a1974
Shr Ernd	$.07	$.06
Revenue	459,289	440,983
Disc Op	.....	(1,052)
Earnings	50,860	40,562
6 Mo Shr	.16	.15
Revenue	927,195	898,569
Disc Op	.....	8,685

a-Restated for discontinued operations and to charge off R&D costs.

COMPUTER COMMUNICATIONS
Three Months Ended Sept. 30

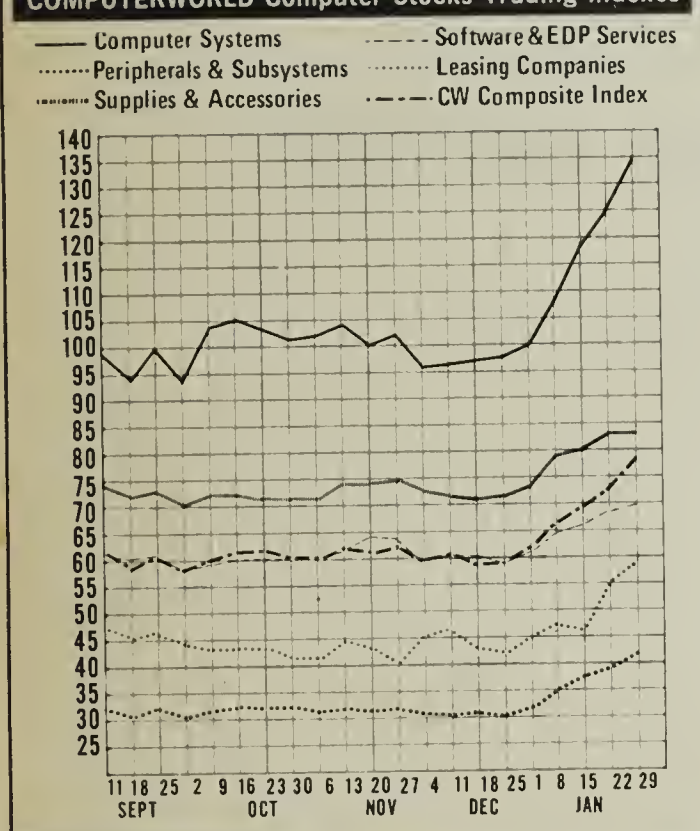
	1975	1974
Shr Ernd	$.06	$.04
Revenue	a1,471,626	1,367,469
Tax Cred	78,000	51,000
Earnings	158,901	103,062

a-includes $320,000 gain under agreement to sell Memorex equipment.

WESTERN DIGITAL
Three Months Ended Oct. 4

	1975	1974
Shr Ernd	.....	$.12
Revenue	$3,037,000	3,780,000
Earnings	(346,000)	169,000

COMPUTERWORLD Computer Stocks Trading Indexes



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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 28, 1976

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1975-76 RANGE (1)	CLOSE JAN 28 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-109	102	+2 1/4	+2.2
O	COMPUTER AUTOMATION	2- 15	14 5/8	+1 1/8	+8.3
N	CONTROL DATA CORP	11- 24	23 1/2	+1 5/8	+7.4
N	DATA GENERAL CORP	10- 49	45 1/4	- 3/8	-0.8
O	DATAPOINT CORP	6- 28	27 1/2	+ 3/4	+2.8
O	DIGITAL COMP CONTROL	1- 4	3	+1 1/2	+100.0
N	DIGITAL EQUIPMENT	46-163	156 1/4	-4 3/4	-2.9
N	ELECTRONIC ASSOC.	2- 3	3 1/4	+ 1/2	+18.1
A	ELECTRONIC ENGINEER.	5- 10	8 3/4	- 5/8	-6.6
N	FOXBORO	23- 42	33 1/8	+ 1/4	+0.7
O	GENERAL AUTOMATION	4- 14	8	+ 3/4	+10.3
O	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	58-120	108 3/8	-1 5/8	-1.4
N	HONEYWELL INC	22- 49	47 3/4	+3	+6.7
N	IBM	158-254	251	+3 1/2	+1.4
O	MANAGEMENT ASSIST	1- 1	1 1/4	+ 1/4	+25.0
O	MEMOREX	1- 10	15 1/8	+4 5/8	+44.0
O	MICRODATA CORP	2- 17	14 3/4	-1 1/4	-7.8
C	MODULAR COMPUTER SYS	5- 19	12	0	0.0
N	NCR	15- 39	27 3/4	-1 7/8	-6.3
O	PRIME COMPUTER INC	2- 7	6 1/4	+ 1/4	+4.1
N	PERKIN-ELMER	16- 30	25 5/8	+1 3/8	+5.6
N	RAYTHEON CO	26- 59	48 1/2	- 5/8	-1.2
N	SPERRY RAND	26- 49	43 1/4	+ 1/4	+0.5
O	SYCOR INC	5- 23	22	- 1/4	-1.1
A	SYSTEMS ENG. LABS	1- 9	7 5/8	+ 7/8	+12.9
N	VARIAN ASSOCIATES	7- 13	14 3/4	+ 3/4	+5.3
N	WANG LABS.	7- 17	14 3/8	+ 5/8	+4.5

LEASING COMPANIES

EXCH		1975-76 RANGE (1)	CLOSE JAN 28 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 5	5 3/8	+1 1/8	+26.4
A	COMMERCE GROUP CORP	2- 4	2 3/4	+ 1/8	+4.7
A	COMPUTER INVESTORS GRP	1- 2	1 3/8	+ 1/8	+10.0
M	DATRONIC RENTAL	1- 1	3/8	+ 1/8	+50.0
A	DCL INC	0- 1	1/2	+	+14.1
N	DPF INC	3- 6	6 1/4	+ 7/8	+16.2
O	EGP RESOURCES	1- 2	3/4	0	0.0
A	GRANITE MGT	1- 5	4 1/2	0	0.0
A	GREYHOUND COMPUTER	2- 3	3	+ 1/4	+9.0
N	ITEL	3- 9	7 7/8	- 1/8	-1.5
N	LEASCO CORP	4- 9	8 5/8	+ 1/4	+2.9
O	LEASPAC CORP	1- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	0- 4	3/8	0	0.0
A	PIONEER TEX CORP	2- 7	6 5/8	+ 1/4	+3.9
A	ROCKWOOD COMPUTER	1- 1	1/8	0	0.0
N	U.S. LEASING	7- 14	9 5/8	0	0.0

SOFTWARE & EDP SERVICES

EXCH		1975-76 RANGE (1)	CLOSE JAN 28 1976	WEEK NET CHNGE	WEEK PCT CHNGE
T	ADVANCED COMP TECH	1- 1	1	0	0.0
A	APPLIED DATA RES.	1- 10	2 3/8	+ 3/8	+18.7
N	AUTOMATIC DATA PROC	29- 65	62	+2 3/4	+4.6
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	COLEMAN AMERICAN COS	4- 6	4 7/8	- 3/8	-7.1
O	COMPUTER DIMENSIONS	2- 6	3 7/8	- 1/8	-3.1
O	COMP ELECTION SYSTMS	3- 7	5 1/2	- 1/2	-8.3
O	COMPUTER HORIZONS	1- 1	1/2	0	0.0
O	COMPUTER NETWORK	1- 3	2 1/4	+ 1/8	+5.8
N	COMPUTER SCIENCES	2- 6	5 1/4	0	0.0
O	COMPUTER TASK GROUP	1- 1	7/8	+ 1/8	+16.6
O	COMPUTER USAGE	2- 4	2 7/8	- 3/8	-11.5
O	COMSHARE	2- 4	2 3/8	+ 3/8	+18.7
O	COMTEN INC	1- 5	4 3/8	+ 1/4	+6.0
O	DATATAB	1- 2	1	0	0.0
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	11- 28	13 3/8	- 3/4	-5.3
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	3/4	+ 1/8	+20.0
O	KEANE ASSOCIATES	2- 3	2 1/4	0	0.0
O	KEYDATA CORP	2- 4	3	- 1/8	-4.0
O	LOGICON	3- 5	4 1/4	0	0.0
A	MANAGEMENT DATA	1- 3	1 3/4	+ 1/4	+16.6
A	NATIONAL CSS INC	6- 17	15 1/2	- 1/2	-3.1
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 17	15 3/4	+ 5/8	+4.1
N	PLANNING RESEARCH	2- 6	3 3/4	+ 1/4	+7.1
O	PROGRAMMING & SYS	1- 1	1/2	0	0.0
O	RARIDATA INC	2- 5	3 7/8	+ 1/4	+6.8
O	REYNOLDS & REYNOLD	10- 24	15 1/4	-1 1/2	-8.9
O	SCIENTIFIC COMPUTERS	1- 1	3/4	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1 1/8	0	0.0
O	TYMSHARE INC	7- 24	24	+1 1/4	+5.4
A	URS SYSTEMS	2- 4	3 1/8	+ 1/4	+8.6
N	WYLY CORP	2- 5	4 1/4	+1 3/8	+47.8

PERIPHERALS & SUBSYSTEMS

EXCH		1975-76 RANGE (1)	CLOSE JAN 28 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	4- 10	9 7/8	+ 1/2	+5.3
O	ADVANCED MEMORY SYS	1- 8	7 3/8	+ 1/4	+3.5
N	AMPEX CORP	3- 7	5 3/4	0	0.0
O	ANDERSON JACOBSON	1- 3	2 1/2	+ 1/8	+5.2
O	BEEHIVE MEDICAL ELEC	1- 5	3 1/2	- 1/8	-3.4
A	BOLT,BERANEK & NEW	5- 13	6 7/8	0	0.0
N	BUNKER-RAMO	4- 8	5 1/8	+ 1/8	+2.5
A	CALCOMP	3- 7	4 3/8	+ 1/4	+6.0
O	CAMBRIDGE MEMORIES	1- 5	2 5/8	+ 1/2	+23.5
N	CENTRONICS DATA COMP	7- 29	28 5/8	+5 3/8	+23.1
O	CODEX CORP	15- 38	23	-1	-4.1
O	COGNITRONICS	1- 2	7/8	- 1/8	-12.5
O	COMPUTER COMMUN.	1- 2	1 5/8	+ 1/4	+18.1
O	COMPUTER CONSOLES	3- 7	4 1/4	- 3/8	-8.1
A	COMPUTER EQUIPMENT	1- 2	1 1/2	0	0.0
O	COMPUTER MACHINERY	1- 2	1 5/8	+ 1/4	+18.1
O	COMPUTER TRANSCEIVER	1- 2	1	+ 1/4	+33.3
O	COMTEN	2- 5	4 3/8	+ 1/2	+12.9
N	CONRAC CORP	12- 30	21 5/8	-1 5/8	-6.9
O	DATA ACCESS SYSTEMS	1- 3	2 1/4	+ 1/2	+28.5
O	DATA 100	5- 16	7 1/8	- 3/4	-9.5
A	DATA PRODUCTS CORP	2- 7	7	+1	+16.6
O	DATA TECHNOLOGY	1- 3	1 7/8	+ 1/8	+7.1
O	DATUM INC	1- 2	1 1/8	- 1/8	-10.0
O	DECISION DATA COMPUT	2- 7	3 1/4	0	0.0
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
O	DIXAN CONTROLS	1- 1	1/2	0	0.0
N	ELECTRONIC M & M	1- 3	1 3/4	0	0.0
O	FABRI-TEK	1- 1	3/4	0	0.0
O	GENERAL COMPUTER SYS	1- 2	1 1/2	- 1/2	-25.0
N	HAZELTINE CORP	3- 9	8 1/8	+3 1/4	+66.6
N	HARRIS CORP	18- 39	39 1/4	+3 1/4	+9.0
A	INCOTERM CORP	3- 12	11 1/8	+ 1/2	+4.7
O	INFOREX INC	2- 5	2 7/8	- 3/8	-11.5
O	INFORMATION INTL INC	8- 14	10 1/2	- 3/8	-3.4
O	INTEL CORP	21- 89	R2	+10 1/2	+14.6
A	LUNDY ELECTRONICS	3- 7	6 5/8	+ 1/4	+3.9
O	MSI DATA CORP	3- 10	4 1/2	+1	+28.5
A	MILGO ELECTRONICS	8- 24	18 3/8	+ 1/8	+0.6
N	MOHAWK DATA SCI	1- 5	3 3/4	+ 5/8	+20.0
O	OPTICAL SCANNING	1- 3	1 1/2	- 1/4	-14.2
O	PENRIL CORP	1- 2	1 1/2	0	0.0
A	PERTEC CORP	2- 8	5 3/4	+ 1/2	+9.5
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INSI.	1- 1	3/4	+ 3/8	+100.0
O	QUANTOR CORP	2- 6	4 5/8	+ 1/4	+5.7
O	RECOGNITION EQUIP	2- 9	6 3/4	- 3/8	-5.2
N	SANDERS ASSOCIATES	3- 11	7 1/8	+ 3/4	+11.7
O	SCAN DATA	1- 3	2 5/8	- 1/8	-4.5
O	STORAGE TECHNOLOGY	6- 17	9 1/2	-1 1/2	-13.6
O	T BAR INC	3- 6	6 1/8	+ 1/4	+4.2
O	TALLY CORP.	1- 5	3 1/2	- 1/4	-6.6
O	TEC INC	1- 4	3 1/4	+ 1/4	+8.3
N	TEKTRONIX INC	18- 51	51 1/4	+ 1/2	+0.9
N	TELEX	1- 3	2 3/8	0	0.0
O	WANGCO INC	4- 15	14 3/4	+2 3/8	+19.1
O	WILTEK INC	1- 4	2	+ 1/2	+33.3

SUPPLIES & ACCESSORIES

EXCH		1975-76 RANGE (1)	CLOSE JAN 28 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED SYSTEMS INC	1- 3	1 1/4	0	0.0
O	BALTIMORE BUS FORMS	4- 5	4 1/4	- 1/4	-5.5
A	BARRY WRIGHT	5- 7	6 5/8	+ 3/8	+6.0
O	CYBERMATICS INC	0- 1	3/8	0	0.0
A	DATA DOCUMENTS	29- 42	39 7/8	+1 1/2	+3.9
O	DUPLEX PRODUCTS INC	12- 25	20 5/8	+1 7/8	+10.0
N	ENNIS BUS. FORMS	5- 7	6 1/2	+ 1/2	+8.3
O	GRAHAM MAGNETICS	5- 10	9	- 3/4	-7.6
O	GRAPHIC CONTROLS	8- 21	15 1/4	- 1/4	-1.6
N	3M COMPANY	43- 68	59 1/2	- 1/2	-0.8
O	MOORE CORP LTD	39- 51	48 1/4	-2 1/4	-4.4
N	NASHUA CORP	9- 22	11 5/8	+ 1/4	+2.1
O	STANDARD REGISTER	11- 20	17 1/4	+ 3/4	+4.5
O	TAB PRODUCTS CO	4- 8	6	+ 1/2	+9.0
N	VARCO	17- 24	21 1/8	-2	-8.6
O	VANIER GRAPHICS CORP	4- 7	5	- 1/4	-4.7
A	WABASH MAGNETICS	3- 5	5 1/8	+ 1/4	+5.1
N	WALLACE BUS FORMS	15- 25	21 1/4	+ 5/8	+3.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

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